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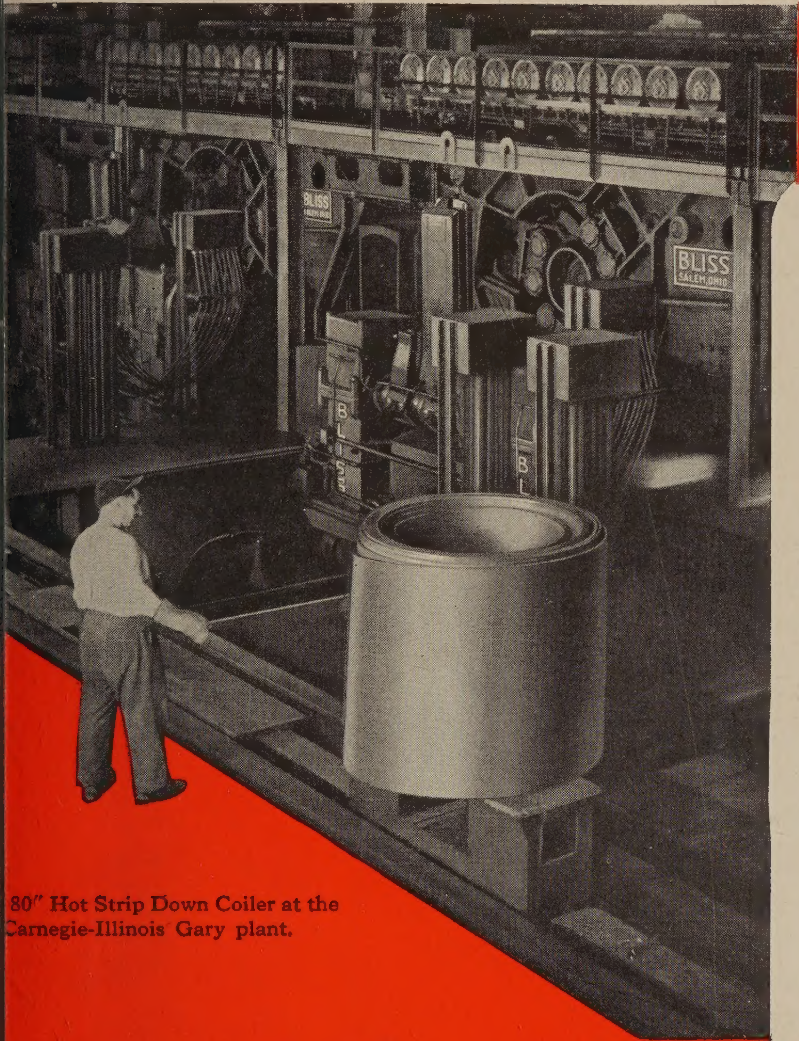
Illinois U Library

The
IRON AGE

AUGUST 19, 1948



80″ Hot Strip Down Coiler at the
arnegie-Illinois Gary plant.

Another Bliss Original

Tightly wound, smooth-edged coils that make for easy stacking and handling, quick ejection of finished coils, fast winding speed, extreme versatility as to gage and coil width, easy maintenance and minimum blocker roll wear—those are results this 80″ Hot Strip Down Coiler gives. Engineered and built by Bliss for the Carnegie-Illinois Steel Corporation, it's the first design to use an expanding mandrel, which makes possible *all* these results.

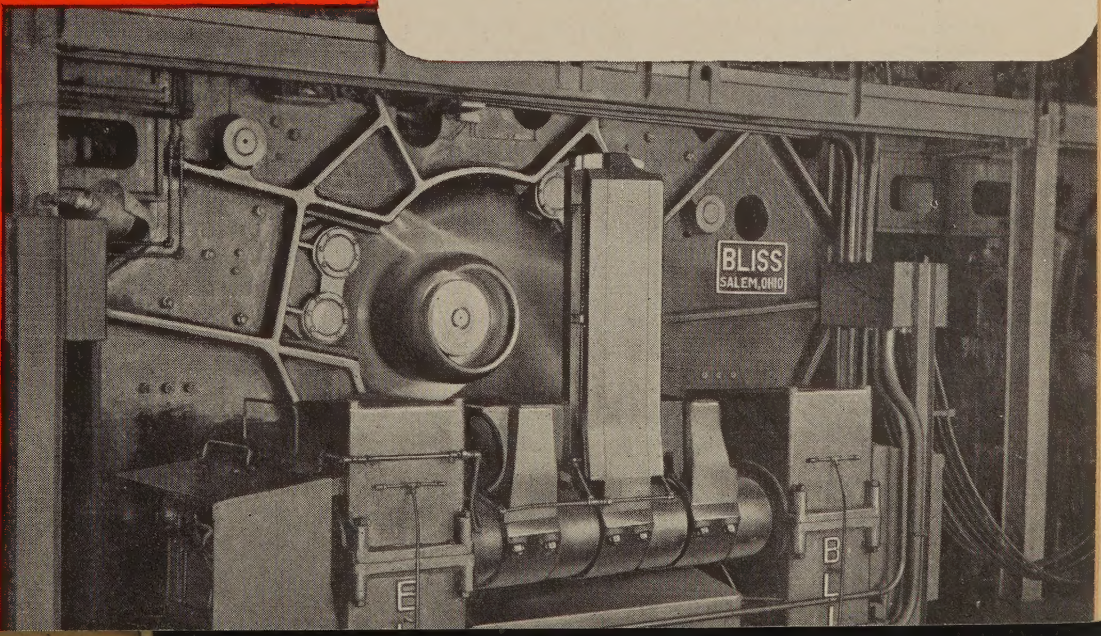
There were engineers who said it couldn't be done for hot strip, but Bliss succeeded where others would not try.

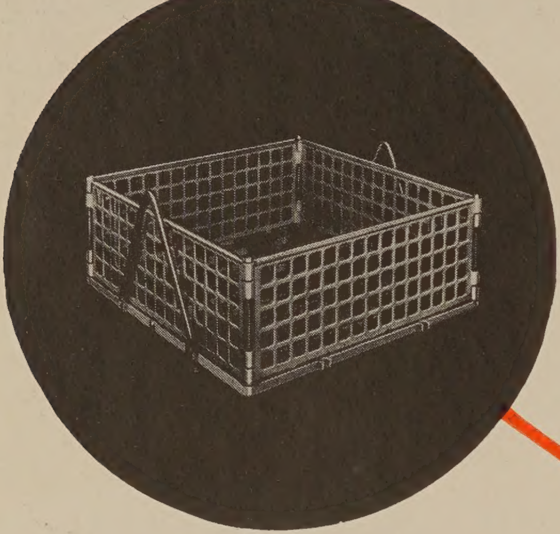
Hot or cold rolling of ferrous or non-ferrous metals ...2-, 3-, 4-high, or cluster mills...Bliss builds them all to meet your requirements. For keen engineering counsel on rolling mills, as on presses, put your problem up to Bliss.

E. W. BLISS COMPANY, DETROIT 2, MICHIGAN
Rolling Mills, Mechanical and Hydraulic Presses,
Container Machinery

n photograph of coiler producing
a coil.

ROLLING MILLS, TOO,
Y AHEAD WITH BLISS



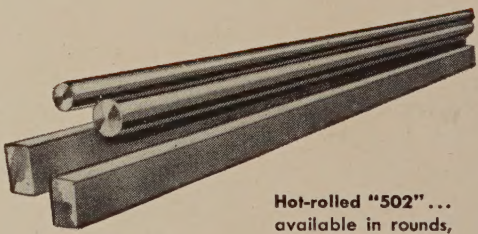


put the heat on **"502"***

*Hoskins *heat resistant* Alloy "502" . . .
cast or hot-rolled.

Put the heat on "502" . . . cast or hot-rolled . . . and get a new idea of what to expect of a heat resistant alloy. It's strong. It's durable. It's ductile . . . even after long, hot continuous use. It's highly resistant to oxidation . . . practically immune to the destructive action of most furnace gases. And, though light in structural weight, it possesses excellent load carrying ability.

So, next time you need a metal to handle a hot job, specify Hoskins Alloy "502". It'll fill the bill. And whenever you're up against a casting design problem, make use of our engineering services. With over 4000 tried and proven designs now on file, chances are your problem has already been solved.



Hot-rolled "502" . . . available in rounds, squares and flats of many different sizes.

HOSKINS MANUFACTURING COMPANY

4445 LAWTON AVE. • DETROIT 8, MICHIGAN

Chromel®
nickel-chromium wire

Heating Element Alloys ★ Heat Resistant Alloys ★ Thermocouple Alloys ★ Spark Plug Electrode Wire ★ Special Alloys of Nickel ★ Electric Heat Treating and Laboratory Furnaces

THE IRON AGE, published every Thursday by the CHILTON CO. (INC), Chestnut and 56th Sts., Philadelphia 39, Pa
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yearly in United States, its territories and Canada; other Western Hemisphere Countries $15; other Foreig
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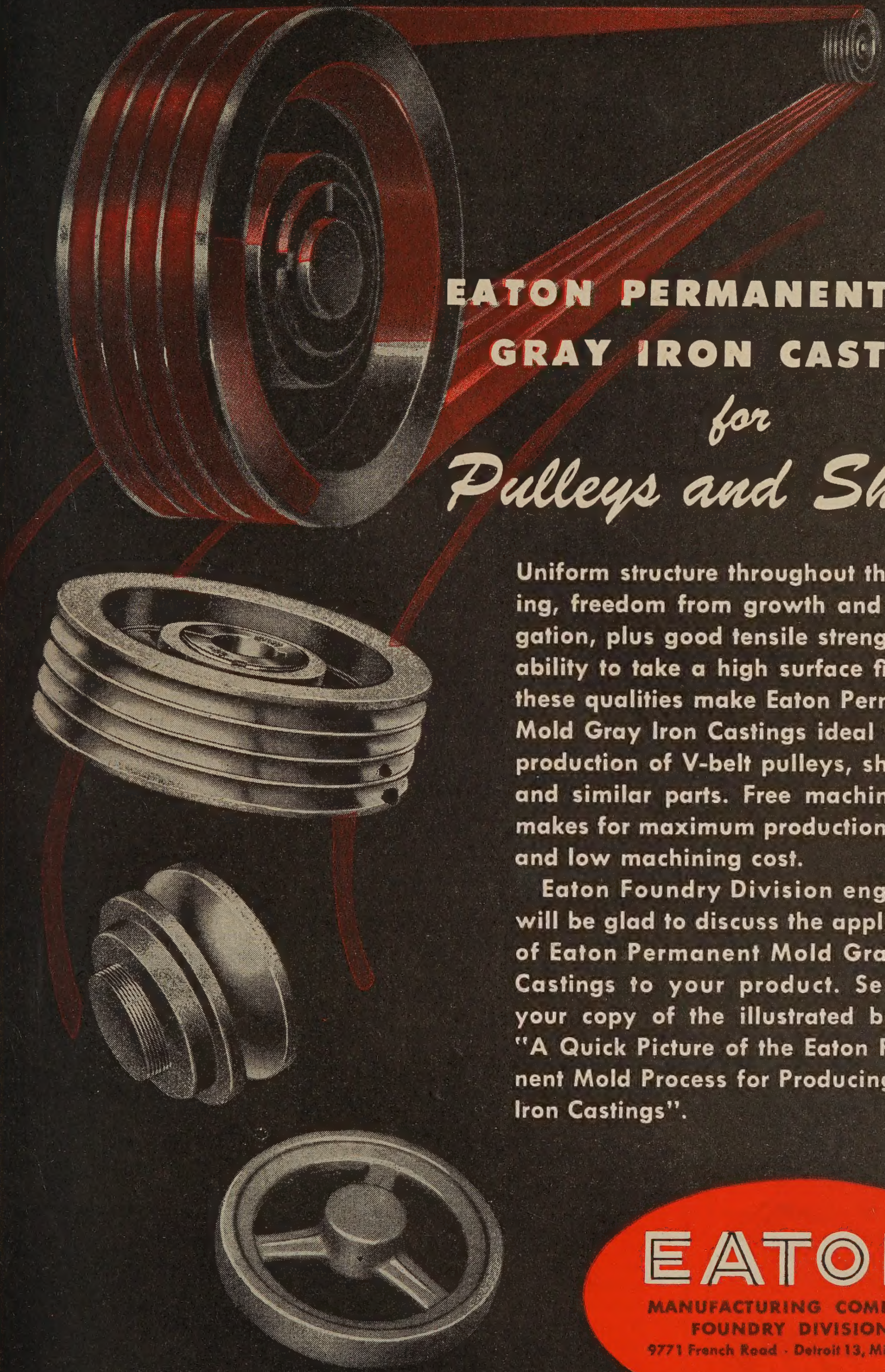


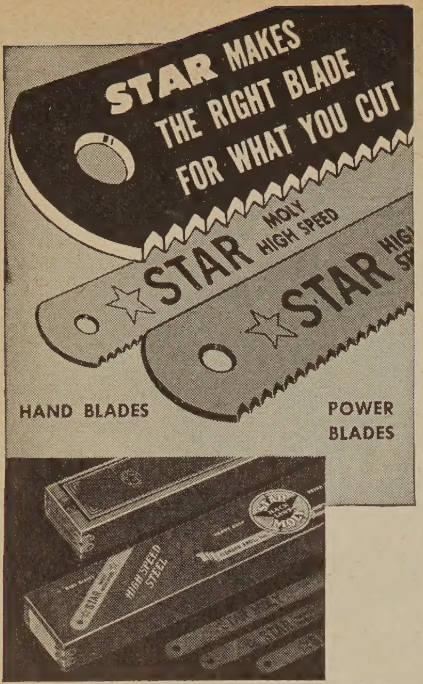
EATON PERMANENT MOLD GRAY IRON CASTINGS

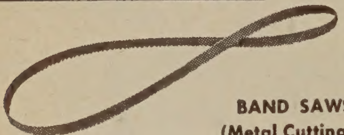
for Pulleys and Sheaves

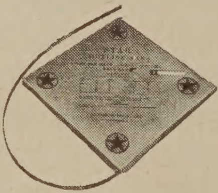
Uniform structure throughout the casting, freedom from growth and segregation, plus good tensile strength and ability to take a high surface finish—these qualities make Eaton Permanent Mold Gray Iron Castings ideal for the production of V-belt pulleys, sheaves, and similar parts. Free machinability makes for maximum production speed and low machining cost.

Eaton Foundry Division engineers will be glad to discuss the application of Eaton Permanent Mold Gray Iron Castings to your product. Send for your copy of the illustrated booklet, "A Quick Picture of the Eaton Permanent Mold Process for Producing Gray Iron Castings".

EATON
MANUFACTURING COMPANY
FOUNDRY DIVISION
9771 French Road · Detroit 13, Michigan







The right blade for *every* job a hack saw or band saw can do—that's what your Star supplier offers. And Star has the *line* to back him up—a *complete* line.

Whether you cut metals or non-metallics—see your Star supplier. He has the blade for longer service, fewer blade replacements—faster, cleaner cutting on any material—the *right* blade for YOU. Ask him for your free copy of "Metal Cutting"—valuable booklet of hints, helps, specifications, prices.

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METAL CUTTING
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STAR
HACK SAW FRAME
FRAMES

CLEMSON

CLEMSON BROS., Inc., Middletown, N.Y.
Makers of hand and power hack saw blades, frames, metal-cutting band saw blades and the Clemson D-17 lawn machine

Fatigue Cracks

BY C. T. POST

Civilization

• • You've heard tell of the industry-minded missionary in Lagos, Nigeria, who encourages his young native followers to bombard American industrial publishers and manufacturers for literature. Remember how one firm, impressed by the volume of requests for catalogs on precision machine tools, was all set to fly a top-flight representative to what seemed to be an important West African industrial oasis . . . until it discovered that the Empire Consolidated Manufacturing Co., Ltd., and similarly impressive concerns, were limited only by the imagination of what might spring from a thatched hut?

Last week the boat came in from Lagos, bringing the usual pleas for samples of your favorite family journal with promises of patronage to follow. One missive was carefully wrapped in a page torn from the Lagos *Daily Service* of April 22, which we would judge to be the f.f.j. of Lagos. The letter was the usual, but the *Daily Service* put an entirely different light on possible trade which might be set up between here and there. America has machines to offer, mass production of creature comforts. Lagos, a letter to the editor clearly shows, can furnish props to prevent our social structure from tumbling like Jericho's walls. Under the heading, "Why Not Nigerian Dances?", the *Daily Service*'s correspondent says:

> *"A couple of days ago, a correspondent wrote about the immoral ways in which our girls conduct themselves in our society, especially when dancing. There is no doubt that worse things happen in the dancing houses and pubs than at any other place.*
>
> *"Those who have the highest regard for our own culture will admit that it has no room for the ball-room system of dancing. There is no known tribe in Nigeria whose men cannot dance without holding women in their arms. A dance that lands (sic) itself to diverse tempetations and consequential views. This is the root of it all. There is hardly any dance now in which men do not hold women's hands and waists. I understand that a Minister of Religion had to separate dancing couples somewhere along the Marina a couple of evenings ago.*
>
> *"Days were when Africans were called apes. Are we not perpetuating that name by aping Europeans? It is a national disgrace to see Africans organise competitions in foreign dancing when they have their own tribal dances. It will be a load off our head if the Egbe Omo Oduduwa, a society which among other things, is out to keep sacred and preserve our culture, and the Women's Party, will use their influence to discourage the idea of aping the white man in dancing and to be more original and less artificial. Why not indulge in and enjoy decent Nigerian dances?*
>
> *Yours truly, O. F."*

Hear, Murray and Astaire, the sounding of the sixth trumpet. Shake out your grass skirts while there is yet time. Let us send our punch presses and automatic screw to Lagos. Perhaps they'll send a couple of dancing instructors in return. Ready now. There go the drums. One, two, step, bongo, bongo, bongo.

Exclamation Point

• • As happens to all men with progeny in school, the apple of the eye of one of your f.f.j.'s veteran editors approached pop the other night for a little professional counsel on a theme composed for college English. Pop swelled with pride as he looked it over, said he could find nothing wrong except the punctuation. Taking his editorial blue pencil in hand, he proceeded to rearrange commas, periods, hyphens, and exclamation points.

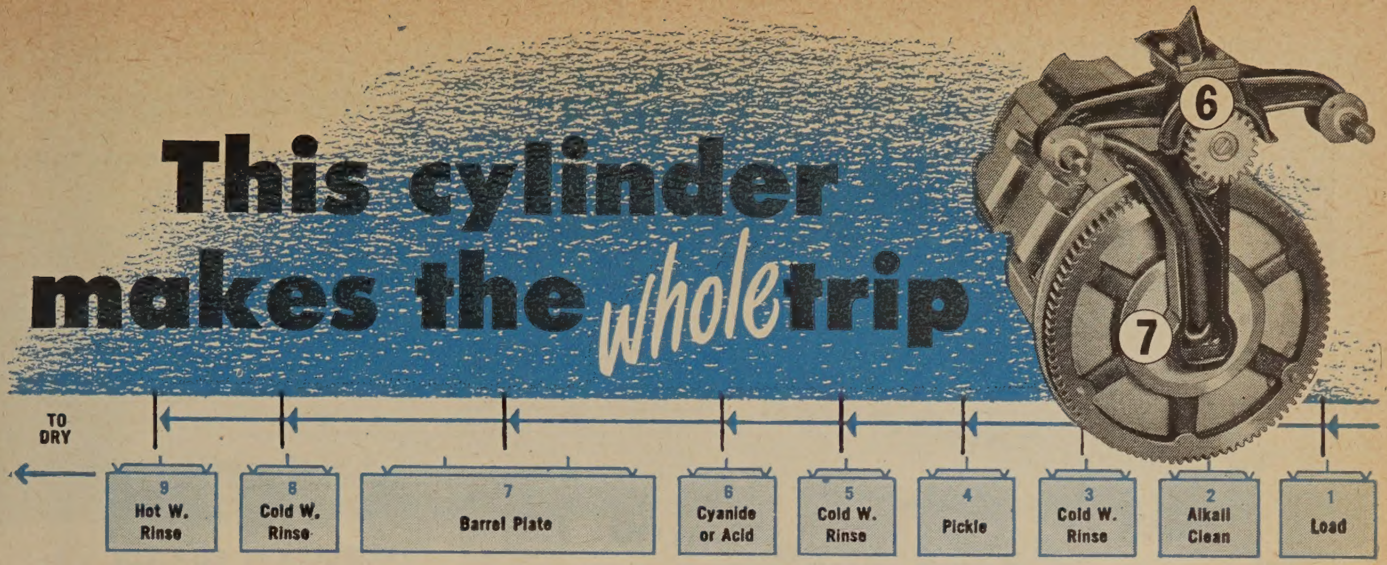
Buttressed by the wisdom of 25 years of journalistic experience, Sonny turned in his masterpiece, awaited the professor's verdict with confidence. A week later, he came home crestfallen, scornfully handed dad the corrected paper. Across the top was the prof's note: "B+—would have been A except for punctuation."

And then there was the case of one of the younger fathers who marvelled at the trail blazed by his precocious 7-year old in a "progressive" school whose teaching methods seemed unorthodox but seemed to get results. It was unprecedented when the moppet came to poppa for help on subtracting 27 from 35.

Putting his arm around his offspring, dad started to explain that the first step was to take the 7 from the 5, borrowing . . .

"Oh, but daddy," he was interrupted, "that's old fashioned! They don't do it that way any more. First, we take the 2 from the 3. It's much easier."

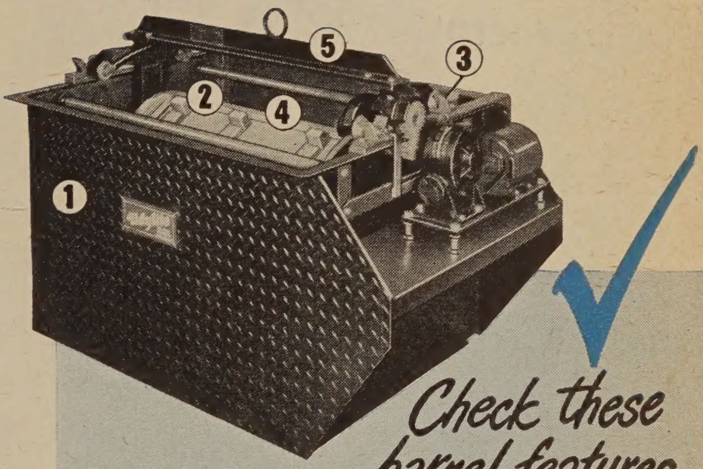
This cylinder makes the *whole* trip



because
it's Built to TAKE IT!

The "inside story" of Udylite's more efficient barrel-plating is *a remarkable new cylinder material able to withstand hot cyanide solutions, hot stannate, and both acids and alkalies.* This means you no longer have to transfer work from the cleaning cylinder to the plating cylinder. Your production proceeds more continuously, without time-wasting transfers—especially valuable in processing work which is difficult to transfer, for example, small flat stampings. The work is tumbled in all stations. And you get the important advantages of *electro-cleaning* . . . a real help in removing dirt and grease from deep recesses or from cup-shaped parts.

This advance barrel plater and cylinder is warp-proof, abrasion-resistant, and built to serve for *years!* Use it for complete one-process cycles, or for other processes simply by cleaning it. Get further details without delay . . . write today!



Check these barrel features

1. **Big, double-welded tank (largest standard barrel tank on the market). Leak-proof construction. Easily accommodates heating or cooling coils.**
2. **"Deep-Dip" Plating Cylinder. Hangs deeply in the tank to submerge completely inside of barrel, for greater current capacity and *faster* plating.**
3. **Heavy contact saddles, of cast brass, machined for perfect contact with cathode horns. Self-locking device prevents barrel rocking.**
4. **Rigid rails, reinforced by ¾" steel stay bolts running length of cylinder.**
5. **Large, steel bridge member holds cylinder in rigid alignment.**
6. **Steel pinions are hardened and ground for longer life.**
7. **Cylinder rotates on large, non-treeing bearings.**

THE
Udylite
CORPORATION

NAME WHAT YOU NEED . . . UDYLITE HAS IT!

● In addition to the sturdiest, most efficient plating barrels ever built (for both acid and cyanide), Udylite offers a complete line of Fully Automatic and Semi-Automatic Plating Machines, tested laboratory supplies, and *complete service,* from no-cost testing of your solutions to design of entire plating plants. Call in a Udylite Technical Man on *any* plating problem!

Udylite Corporation, Detroit 11, Michigan

"Pioneer of a Better Way in Plating"

FORT PITT BRIDGE

. . . an organization of practical, experienced steel fabricators and erectors—long experienced in every phase of structural steel construction . . . .

. . . with excellent plant and research facilities . . . all closely co-ordinated for maximum cooperation between the architect, the engineer, the contractor and the owner. Let Fort Pitt Bridge work with you on any structural problem involving added plant facilities or new plant construction.

FORT PITT BRIDGE WORKS

Member American Institute of Steel Construction

General Offices, Pittsburgh, Pa. • Plant at Canonsburg, Pa.

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New York, N.Y., 441 Lexington Ave.
Columbus, Ohio, Huntington Bank Bldg.
Cleveland, Ohio . Bulkley Building
Detroit, Michigan . New Center Bldg.

Dear Editor:

SUPERSONIC FLAW DETECTORS

Sir:

I am seeking a source of supply of supersonic flaw detectors used to ascertain defects in materials. I will be very grateful if you can give me names and addresses of suppliers of such instruments.

GEORGE L. SOMLO

G. L. Somlo Technical Agency
Budapest, Hungary

- **A list of companies supplying such instruments has been sent.—Ed.**

PRODUCTION CONTROL

Sir:

In your June 3 issue there is an article "Production Control in a High Alloy Steel Plant." We would like to obtain two or three copies of this feature.

S. J. NATHAN
Manager

British Iron & Steel Corp.
New York

TOOL ROOM HEAT TREATMENT

Sir:

I read with interest the series of papers titled "Practical Tool Room Heat Treatment" in the March 7, 14, 21 and 28, 1946 issues. Please send me reprints of these articles and bill me any charges.

GRANT W. LaPIER
Engineering Dept.

Cleveland Graphite Bronz Co.
Cleveland

- **Reprints of the article are 50¢ each.—Ed.**

VACUUM CASTING

Sir:

We would like to receive a reprint of the article "Wetherill Vacuum Casting Process" from the Aug. 14, 1947 issue.

M. C. CLARKSON

F. J. Stokes Machine Co.
Philadelphia

- **Tearsheets have been mailed.—Ed.**

BASING POINTS

Sir:

If you have reprints of the article "Steel Basing Points and the Consumer" which appeared in the July 1 issue, I should appreciate receiving a copy.

E. H. ROBERTSON
Dept. of Manufacture

Chamber of Commerce of the U.S.A.
Washington

STAINLESS STEEL VALVES

Sir:

In the Newsfront section of your June 8 issue a new stainless steel valve weighing 10 to 15 pct of the

1½ MINUTES PER PIECE . . . . .

. . with the Monarch "Air-Gage Tracer"

on the

Mona-Matic

with

Rear Tool Slide

JOB FACTS . . . SAE 4620 shaft, 11″ long, 1⅜″ diameter. Produced in two operations on Monarch Mona-Matic with "Air-Gage Tracer" and rear slide. Total machining time for *both* ends, 1.50 minutes. Total handling time, both ends, .50 minutes. Set-up time, both ends, 23.25 minutes.

Here's high-speed, automatic-cycle metal turning at its best.

The Monarch Mona-Matic with "Air-Gage Tracer" combines the advantages of single point, *uninterrupted cut* metal turning with the speed formerly restricted to complicated multiple tool machines. Tools in the rear slide perform all necking cuts at any desired time during the cycle.

Tracing directly from a master template, the "Air-Gage Tracer" guided cutting tool turns out work so accurately that the amount of grinding stock may often be reduced by more than half. One operator can service a battery of two machines, *easily*—thereby doubling output per machine.

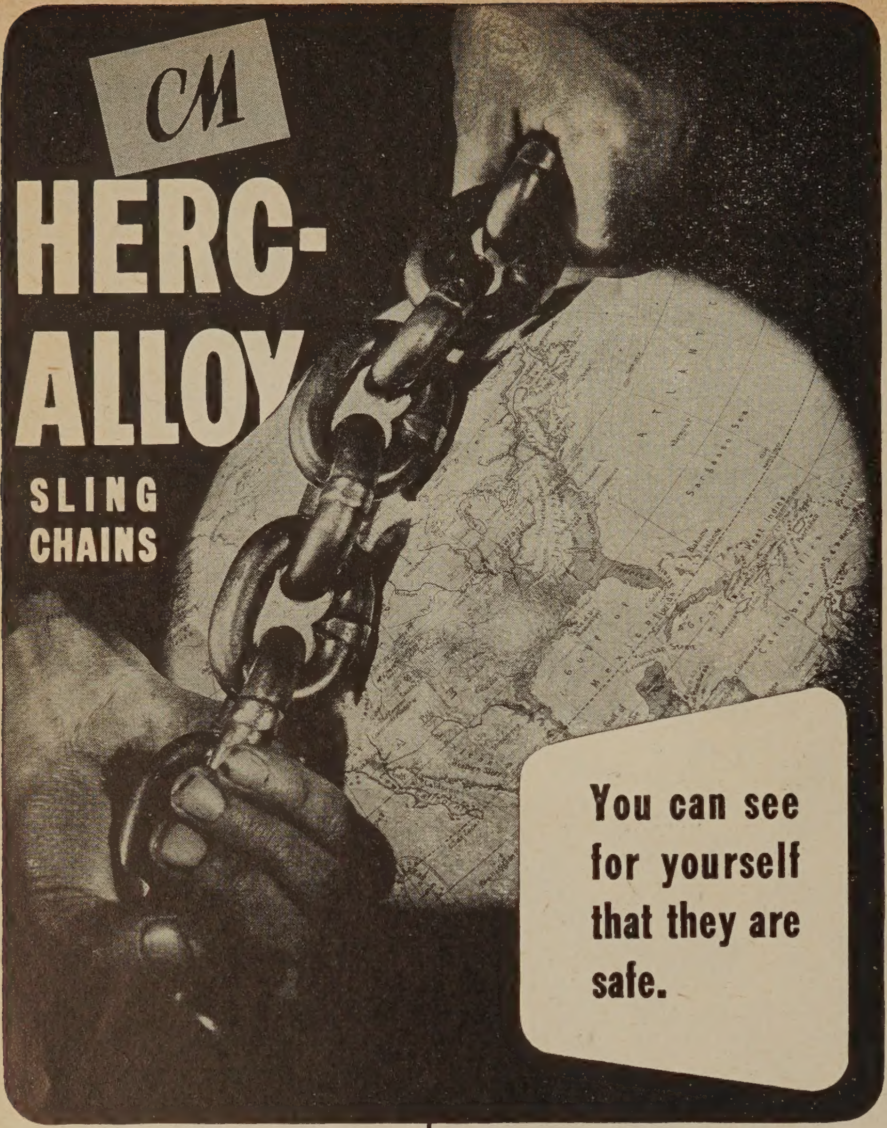
You save on production rate, on grinding time, on tooling cost, on set-up time. And the average set-up time of 10 to 15 minutes makes the timesaving, money-saving advantages of the Mona-Matic applicable to many jobs in your shop.

Like more facts? We'll be glad to supply complete details after we have the opportunity to study your production turning requirements.

ACCURACY · ECONOMY · LONG LIFE

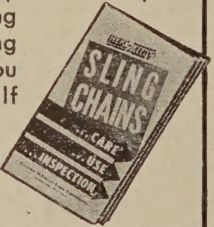
Monarch
TURNING MACHINES

THE MONARCH MACHINE TOOL COMPANY • • • Sidney, Ohio



● Just one of the big advantages of HERC-ALLOY Sling Chains is that you can determine their serviceability by a simple visual inspection.* Ordinary steel or iron chains, on the contrary, grow dangerously brittle with age… an insidious threat to the safety of men and materials. That's why more and more of the important companies are standardizing on HERC-ALLOY Sling Chains…because you can see for yourself that they're safe.

*Write for your copy of this new, informative booklet. No charge.



HERC-ALLOY FEATURES

- America's *first* alloy steel sling chain…first to bear a serial number.
- *Every* CM HERC-ALLOY Sling Chain is alloy steel throughout…links, rings, hooks. There is only one grade…*the best.*
- Every chain is individually tested and accompanied by a certificate of registration.
- Links are side welded for maximum strength by patented INSWELL electric method.
- HERC-ALLOY Chains should never be annealed.
- HERC-ALLOY Chains are lighter…stronger…easier to handle…outlast ordinary chains 4 to 5 times…cost less on the job.

HERC-ALLOY…the chain you can *SEE* is safe

COLUMBUS-McKINNON
CHAIN CORPORATION
(Affiliated with Chisholm-Moore Hoist Corporation)
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
SALES OFFICES: New York • Chicago • Cleveland • San Francisco • Los Angeles

See us at Booth National Safety Congress, Stevens Hotel, October 18 to 22—Chicago

weight of cast valves for use with stainless piping and low pressure is mentioned. Please forward the name of the manufacturer.

J. H. DeFREES
Vice President

Pennsylvania Furnace & Iron Co.
Warren, Pa.

• H. K. Ferguson Co., Cleveland, will give you further information on the valves.—Ed.

RESISTANCE WELDING

Sir:

We are interested in obtaining three sets of tearsheets of the article "Functionalized Electronic Controls for Resistance Welding" which appears in the July 8 issue.

A. KIPP
Technical Information Center

Phillips Laboratories
Irvington-on-Hudson, N. Y.

DIE SINKIING MACHINE

Sir:

We noted in your Newsfront page dated June 15 that mention was made of a new die sinking machine. We would appreciate receiving the address of the concern which has developed the machine.

J. M. BUTLER
Staff Assistant

Drop Forge Div., Willys-Overland Motors, Inc.
Toledo

• Pratt Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.—Ed.

HEAT TREATING

Sir:

Please send me two tearsheets on "Modern Heat Treating—A Reference Index" from the June 10 issue.

D. O. LEESE
Research Engineer

Battelle Memorial Institute
Columbus, Ohio

MANAGEMENT METHODS

Sir:

We are interested in purchasing a copy of your book "Practical Management." If this is possible will you please advise, quoting us the cost of the book in quantities of one, three and five copies.

GEORGE H. KILPATRIC

Foster Machine Co.
Westfield, Mass.

• Copies are $3.00 each for any quantity —Ed.

ROLLING MILL CONSULTANT

Sir:

I am interested in contacting a consulting engineer in regard to a joint venture in the field of steel and/or aluminum rolling mill machinery. I am looking for a man

TOO MANY PITCHERS!

FOLKS, they're just coming in too fast—and we *do* mean *orders!* In anything like normal times, we'd be awfully happy to have you pitch your order down our alley. Our past averages speak for themselves.

But *now*—well, honestly fellows—there are too many pitchers on that mound. We're in there swinging as hard as we can but we can only manage to get hold of a few. And there just aren't any pinch-hitters on the bench to help us out.

From your seat, our batting average no doubt looks weak at the present time. But we're doing the best we can and we're hitting 'em safe when we can get hold of 'em.

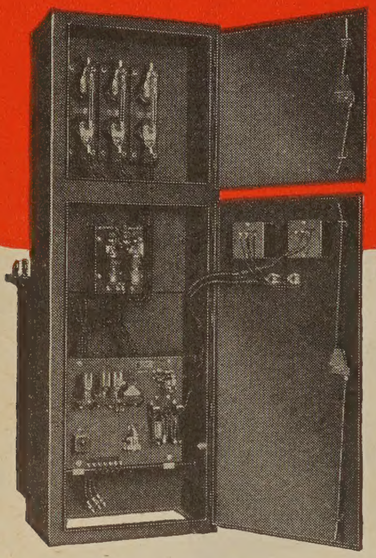
We're asking you to stick around for later innings when things settle down. That's when Wisconsin will really come through with those pay-off blows. Remember, the season isn't over yet. We hope we have a pennant winner for you.

WISCONSIN STEEL COMPANY

(Affiliate of International Harvester Company)
180 North Michigan Avenue Chicago 1, Illinois

WISCONSIN STEEL

EC&M CUBICLE-TYPE STARTERS
for SYNCHRONOUS MOTORS



STANDARD 2300 AND 4600 VOLT STARTER
WITH DISCONNECT SWITCHES

STANDARD 220-550 VOLT STARTER
WITHOUT DISCONNECT SWITCHES

Complete Units -- Push Button Operated
with automatic field application by Polarized Field-Frequency Relay

WITH all internal wiring complete, and totally enclosed, these EC&M unit-type Synchronous Starters provide a quick, low-cost installation. They are shock-proof and do not require an expensive control room. Mounting them out in the plant, alongside the motors they control, keeps the length of heavy cable between motors and starters at a minimum, particularly those designed for reduced voltage starting.

All starters are of the push button, magnetic type arranged to start the motor as a squirrel-cage motor, and then apply direct current field excitation when the motor has attained a speed most favorable for synchronizing. The Polarized Field-Frequency Relay operates *automatically* to pull the motor into step without pole slippage, with minimum current and maximum synchronizing torque.

Being sensitive to motor speed, the relay also operates to remove the field, should the motor pull out of step due to a dip in voltage or to an overload. If the motor has adequate torque to re-accelerate the load up to synchronizing speed, re-synchronization occurs automatically.

Write for Bulletins 1075-B, 1076-B, 1077-A and 1078-A

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79th STREET • CLEVELAND 4, OHIO

with a broad knowledge of machinery, who knows the characteristics and/or chemistry of the materials, and who has had experience in design, specifications and operation. Can you furnish me with one or two leads as to persons to contact?

ROBERT J. FLOOD

Flood & Co.
New York

• We do not feel qualified to pass upon the qualifications of consulting engineers, however, the addresses of other sources that will provide you with the information you are seeking have been sent you.—Ed.

WELDING HINTS

Sir:

Please enter our order for one copy of your "Welding Manual."

C. ERNST

Gleason Works
Rochester

• Copies are $3.00 each.—Ed.

PRODUCTION INCENTIVE

Sir:

We are very interested in the article "Bonus Based on Production Value" in the July 1 issue. This firm is only a small one, but feels that some bonus scheme similar to the one described would be advantageous. Can you give us more information or put us in a position to obtain it?

WILLIAM LINTZ

St. Louis Metalcrafts, Inc.
St. Louis

• A. W. Rucker, Eddy-Rucker-Nickels Co., Cambridge, Mass., who developed the plan, will give you more detailed information.—Ed.

WELDING DISSIMILAR METALS

Sir:

Would you send us two reprints of the article "Welding Dissimilar Metals with Stainless Electrodes" which appeared in the July 1 issue.

G. H. BOHN

Linde Air Products Co.
Tonawanda, N. Y.

PRECISION CASTING

Sir:

Enclosed is our check for $1.00. Will you please send us a copy of your booklet "Precision Investment Casting—Lost Wax Process."

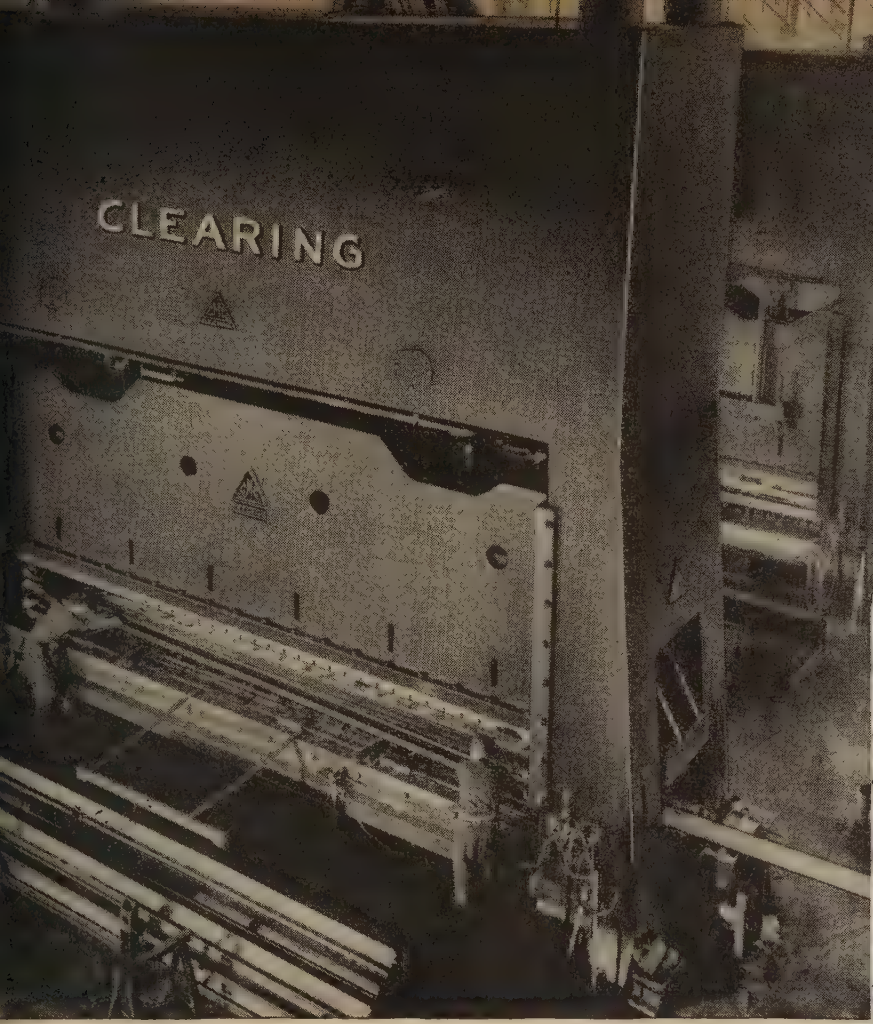
K. W. THOMPSON

K. W. Thompson Tool Co.
Franklin Square, L. I., N. Y.

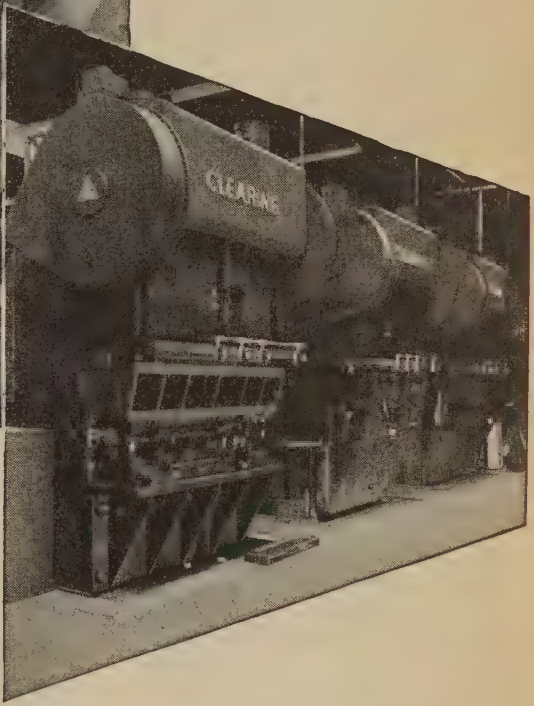
POWDER METALLURGY

Sir:

There are two articles in the April 8 issue in which I am interested. Would it be possible for you to supply me with tearsheets of



Above: CLEARING 3000 TON CRANKLESS PRESSES making rails for automobile chassis.



Right: CLEARING 75 TON GAP FRAME PRESSES in a large appliance plant.

MECHANICAL & HYDRAULIC

LARGE OR SMALL—

THEY SPELL ECONOMY

Thirty-foot rails for bus frames or parts for a household appliance — Clearing presses turn them out swiftly and completely, ready for assembly with no labor costs for grinding, drilling or other subsequent operations. Because Clearing presses deliver accurately formed work, assembly is smooth and rapid. No wonder that production costs are driven down.

Equally important, Clearing affords unique features of design and construction which yield longer die life, with fewer interruptions to production for die repair or regrind. Every production man knows what these items mean on a cost sheet.

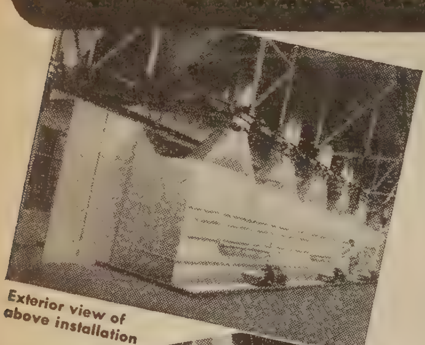
Whether you need 60 tons capacity or 3,000 tons or more, Clearing can furnish a press that will produce for you with maximum economy when all factors are taken into account. That's a plain, straightforward statement. We'd like to have you make us prove it.

CLEARING MACHINE CORPORATION • 6499 West 65th Street • Chicago 38, Illinois

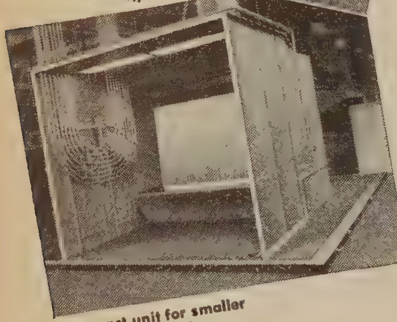
CLEARING THE WAY TO EFFICIENT MASS PRODUCTION

Schmieg
CENTRI-MERGE
IN ACTION

Carries Away Overspray . . .
IN A WHIRLING TORNADO OF WATER



Exterior view of above installation



Compact unit for smaller spraying jobs

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Chief Metallurgist

Moraine Products Div.,
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Sir:

We would appreciate receiving tearsheets of the article "Fixtures Facilitate Induction and Flame Hardening" from the June 24 issue.

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Research Dept.

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Sir:

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Director of Research

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Sir:

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E. K. FOSS
Alloy Steel Metallurgist

A. M. Byers Co.
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SOFT METALS HARDNESSES

Sir:

Will you kindly send me tearsheet copies of the article on "Hardness Testing of Soft Metals" in the June 24 issue and also the article on "Welding Dissimilar Metals with Stainless Electrodes" in the July 1 issue.

J. A. KEARNEY
Metallurgical Dept.

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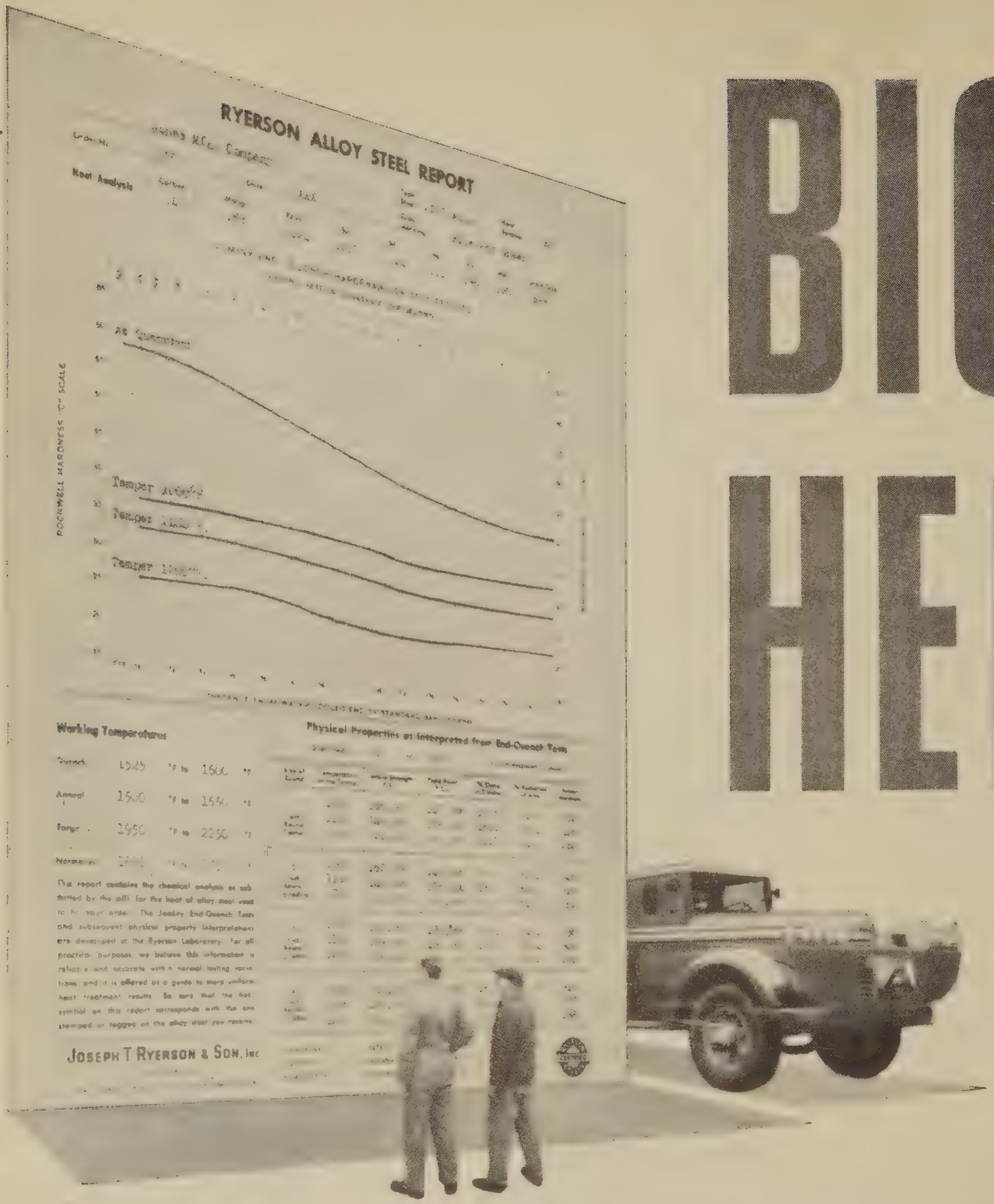
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"too dumb to understand"

LATE in the evening of Saturday, August 7, Congress adjourned the special session summoned by a petulant President in a shabby bid for political advantage in a campaign year. The greater part of the Truman anti-inflation program had been tossed unceremoniously into the legislative wastebasket -- a wholly suitable interment for a preposterous and hypocritical bid for executive power.

The episode adds little credit to the intelligence and probity of Congress. It approved a "loan" of $65 million to the United Nations, appropriated $5 million to buy cars for disabled veterans, passed a measure extending government guaranties and reducing borrower margins for certain classes of private construction, restored the odious Regulation W for the control of consumer credit, and added to the costs of commercial banking by increasing reserve requirements. In terms of intellectual honesty, there is little to choose between the fanciful formula of Harry and the measures finally passed by a sullen Congress.

Having listened to spokesmen of the Federal Reserve Board criticize commercial banks for lax lending, Congress passed a measure which permits a home buyer to borrow 95 per cent of the cost, authorized an additional $800 million of government credit for Title VI rental housing loans, and liberalized several other categories of housing credits. Some voters may properly ask how pouring hundreds of millions into a building materials market already suffering from excessive demand can be anti-inflationary.

Most reprehensible, however, is the restoration of Federal Reserve authority over consumer credit, "the poor man's finance." Regulation W had been imposed by presidential ukase in 1941 under a statute passed during the First World War entitled "Trading With the Enemy Act." It provides bizarre penalties, such as a $10,000 fine and 10 years' imprisonment applicable to the dealer who sells a workingman a second-hand car and gives him 18 months in which to pay, instead of the 15 months which a federal bureau considers the extreme safe limit for such financing. The Federal Advisory Council of the Reserve System consisting of competent bankers, the American Bankers Association, the U. S. Department of Commerce itself through an elaborate study by its own experts, are all on record in opposing the need for consumer finance control.

The facts show that a smaller percentage of furniture and department store sales, new and second-hand cars, refrigerators and washing machines is financed on time payments than before the war. The total of consumer credit outstanding on the basis of figures provided by the Federal Reserve Board itself was equal to 6.6 per cent of the national income at the end of May, 1948, compared with 11.6 per cent at the end of 1940. In 1929 the ratio of consumer debt to total bank loans and investments was 18.2 per cent; in 1940, 15.0 per cent; and at the end of May, 1948, 8.3 per cent.

The restoration of Regulation W as an anti-inflation measure represents a new high in hypocrisy. It rests palpably on that cynical premise once pronounced by a New Deal heavyweight: "The public are just too dumb to understand."

Joseph Stagg Lawrence

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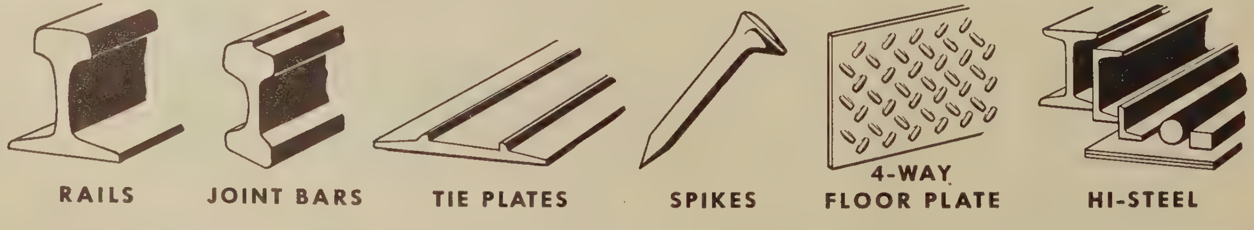


NEWSFRONT

► The Federal Trade Commission has won its basing point battle with the steel industry by default. However, the last word on the subject has not been heard. A number of steel consumers have already yelped loudly upon feeling the impact of f.o.b. mill selling. But the loudest squawk of all will come from many steel consumers who, after studying the matter, decide that their method of selling their own finished products is illegal. Maybe the steel industry is counting on their protests to bring congressional action to legalize the basing point system of selling.

► A current-transformer design is being used to eliminate error-producing effects of stray magnetic fields from the same circuit or nearby equipment. Using the principle of the shielded cable, the primary conductor is fanned out and joined to a copper shell which bends it back so that the windings are completely surrounded. The effect is to isolate the secondary completely from any field but that of the current being measured.

► Possibility of extensive revisions in automobile steel specifications is seen in the present policies of alloy producers in favor of triple alloy steels. Several auto producers have recently been notified of drastic cuts in their fourth quarter allotments of SAE 4000, T1300, 5100 and 9200 grades.

► That the freight car building program topped its 10,000-car goal in June and may top it again in August, tends to obscure the fact that rail transportation's clutch is slipping. On June 1, 1948 there were 72,216 fewer cars at work than there were on VJ-day. Some 50,815 had been retired, while bad order cars climbed by 21,359.

► An interesting angle to the f.o.b. move by steel companies in the Chicago area is that companies on single line hauls within the switching area actually save money. The old arbitrary switching charge was 62¢ regardless of whether it was a 1, 2 or 3 line haul. But the charge for a single line haul is only 54¢.

► Some steel forging plants are using electronic heaters with radio frequencies in the megacycle range. They claim that rupturing, overheating and burning are eliminated, and that faster heating rates are possible since centers of bars and billets are brought to heat as rapidly as the exterior. One plant also has obtained excellent results in heat treating gears by radio frequency heating -- turning out 30,000 without a single rejection.

► Consumers should benefit considerably from the intense competition between gas and electric furnace manufacturers. Both are indulging in extensive technological and development work as they strive for larger participation in the industrial heating and processing fields. Conditions such as this inevitably bring out the best in a field and provide a service to those concerned.

► The lead situation continues to get no better. Government surveys indicate 1949 requirements to be 100,000 tons. This is more than the potential supply -- and does not include ECA requirements of 24,000 tons. Domestic mining might produce an extra 50,000 tons. But the increase will probably be offset by lower scrap supplies caused by a draining of junk-wagon sources by high scrap prices. Little help can be expected from RFC which has already tossed most of its reserve stocks into the breach.

► Simultaneous cycle annealing of up to 8 different grades of low to medium carbon alloy steels, producing in each a good machinable structure, is being accomplished by a large automotive parts producer in a controlled atmosphere radiant tube furnace.

► A large iron ore dephosphorizing plant is being erected at the Grangesborg Co. in Sweden. Their process consists mainly of concentrating the ore and extracting the phosphorus by acid treatment. The plant is expected to be particularly valuable in treating Central Sweden's high phosphorous ores to be used in the manufacture of sponge iron, which is gradually replacing pig iron in Swedish steel production.

► Induction soldering of dairy equipment has recently been perfected. Accurate temperature control is important since there is only a 54°F difference between the melting temperature of the solder and that of the coated tin on the steel sheets.

By T. W. LIPPERT

Directing Editor,

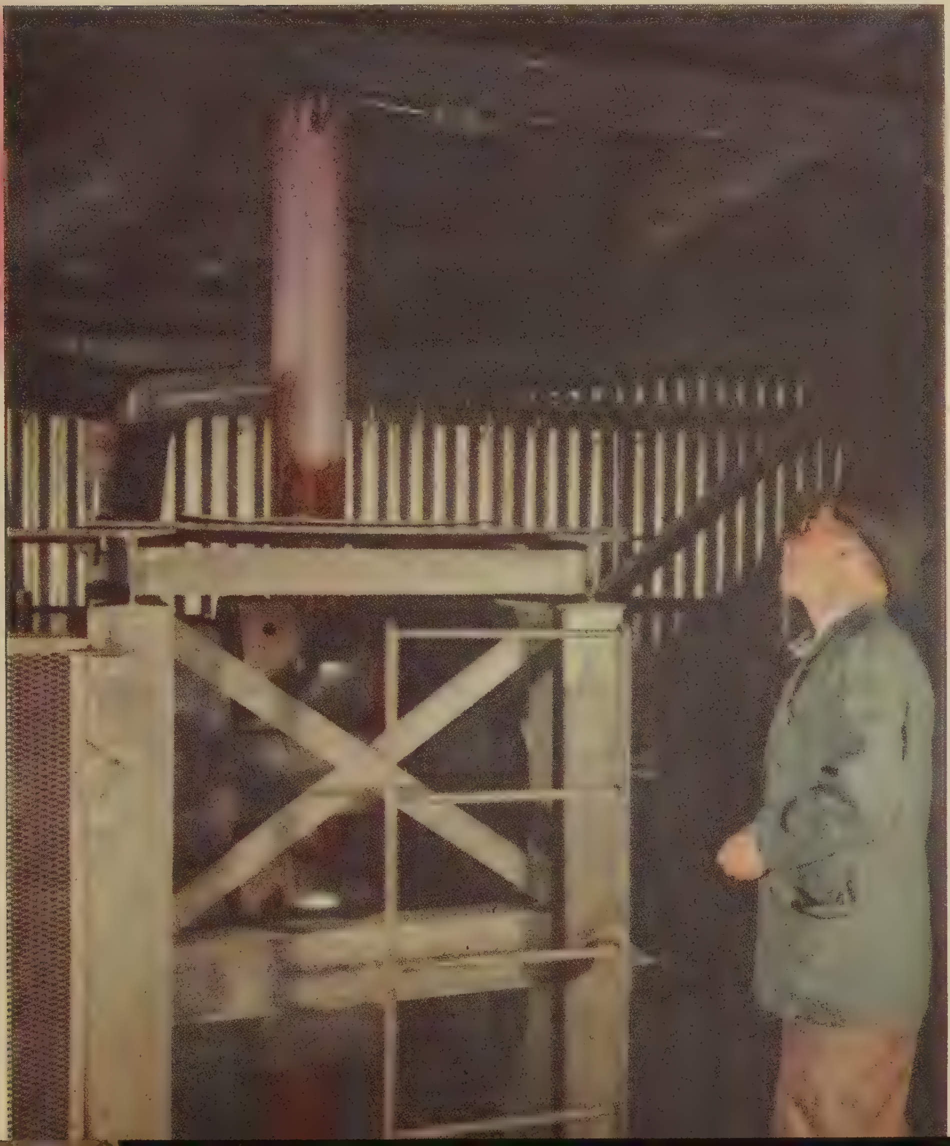
THE IRON AGE

MARCH 18, 1948, was just another day for the steel industry, just another bittersweet 24 hours of too little steel and too many customers. But, it was the uneasy future rather than the frustrating present that spelled problems of such moment as to make the steel producer really wince. His basic raw materials were in deteriorating supply. Operational break-even points had mounted to dangerously high levels. And the capital cost of replacing productive equipment had risen to a point that demanded either a spurt in the productivity curve or a rapidly mounting price structure for finished product. Such was the paradox—these were the factors leading inexorably to greater concentration of productive equipment, but the successful assault on conventional selling practices by the Federal Trade Commission along with the wartime scattering of consuming industries were factors which demanded increasing decentralization.

Some future industrial historian may, however, harken back to March 18, 1948, and pinprick it as a day of conspicuous portent. In the annals of mechanization, that day might, of course, not quite rank with Feb. 8, 1924, when Armco shipped the first sheet-wide steel from its continuous mill at Ashland, Ky. But, it was the day upon which the first carload of rolled bars made from continuously cast steel billets was shipped for conversion into commercial products, and thus the day offered genuine promise of

Continuous Casting of Semifinished Steel

Steel, from liquid phase to semifinished shape, in one simple, inexpensive machine—such has been the vision of a whole host of inventive minds for almost a century. Now, as a joint development of Republic Steel Corp. and Babcock & Wilcox Tube Co., it is an exciting reality at the latter's plant at Beaver Falls, Pa. There's definite promise of an entirely new path toward the twin objectives of the entire steel industry—greater decentralization and increased productivity.



slashing the manhour requirements for a ton of semifinished steel. Even more exciting, there was limned on the horizon a new lease on life for the nonintegrated mill, and such a drastic reduction in the capital cost of productive equipment as to open wide a possible path to greater decentralization.

About six years ago Republic Steel Corp. at its Corrigan-McKinney Plant initiated a development program under the Williams Patents (Edward R. Williams, former president of Vulcan Mold & Iron Co., U. S. Patents 2,079,644, 2,187,720, 2,206,888, 2,284,503 (see partial description of early machines, THE IRON AGE, issues of Feb. 24, 1944, and April 4 and 11, 1940), attacked the problem of continuous casting of steel. In 1944, Republic entered into informal discussions with Babcock & Wilcox Tube Co. These discussions led to a formal agreement in 1946, when exclusive license rights were acquired under the Williams patent. During the year 1944 the work at Cleveland was discontinued and operations were carried on at Barberton, Ohio, where smaller scale facilities made it possible to determine more rapidly some of the basic experimental requirements. These having been determined, the work was moved to Babcock & Wilcox Tube Co.'s plant at Beaver Falls and embodied in a plant capable of experimenting with the casting of commercial sections.

Thus, for several years the partners in this development have been continuously casting experimental runs of carbon and alloy steel billets. However, it was not until March, 1948, that 45 tons of 0.15 C steel was continuously cast and the resultant lengths of 6 in. rounds were shipped to the Canton, Ohio, plant of Republic and there rolled on their 12 in. mill to 1¼x1⅜ in. forging bars. These bars were subsequently delivered to the Buckeye Forging Co., Cleveland, and the parts forged therefrom, for material handling equipment, have long since passed on to the great and anonymous ultimate consumer. More recently continuously cast slabs have been rolled into strip and this strip in turn converted to electric welded boiler tubes meeting all of the physical requirements of the company's regular product.

The partnership in this project, which has resulted in the first commercial success in this field, grew out of recognition on the part of C. M. White, president of Republic, and Isaac Harter, chairman of Babcock & Wilcox, that the combination of the broad knowledge of the former's company in the steel industry and the latter's company in their long experience with the problems of heat transfer at high rates would enable these two concerns to make an effective attack on the problems of continuous casting.

The greatest single gain to be had from this successful process is that it removes from the conventional process of steelmaking the most massive and expensive parts of such plants, that is, equipment for ingots, soaking pits, and the blooming mill. Instead continuous casting permits passing directly from the melt to relatively small size semifinished sections with the result that not only is the capital cost for a given output greatly reduced, but maintenance and operational cost gain in like manner.

The work already done makes it clear that for the production of relatively small quantities of steel and particularly as a means of decentralizing steel production, this new development exactly fills the requirements of low capital and low operational costs. Whether there will be a cross-section size limitation will have to be determined by future work, both in the production of present sizes and other experimental investigations.

Population areas of some 2 million normally can consume in small-section products—flats, wire rods, shapes, etc.—from 7500 to 15,000 tons monthly in the immediate locality. This is a pretty attractive load for a small mill. Furthermore, the scrap generated in the same area would normally be quite sufficient to sustain operations in the same plant. Quite a few such localities are scattered throughout the United States, and changes in the steel industry, such as selling f.o.b. mill, furnish ample reasons for believing that there is a great economic pressure to find a means of locally serving such areas.

A plant of about this size has been worked out to embody these ideas and takes the following form:

Its melt shop will be similar to any modern melt shop of this capacity insofar as scrap handling and furnace facilities are concerned. Naturally there will not be the conventional ingot pouring floor and handling facilities. *The soaking pits and blooming mill would be conspicuously absent.* A connecting building somewhat higher than the melt shop will house two inexpensive casting units that will operate separately in order to facilitate quick size changes and to permit the maximum utilization of personnel. Capacity will consist of two 15-ton arc furnaces operating on a staggered 2-hr cycle (tap to tap) when making ordinary carbon steel.

The melted charge will be delivered to three 5-ton containers which will be used as ladles in taking the metal up to the casting floor. On the casting floor there will be holding stations in addition to the pouring station, both of which will be connected with heating power and in this way the output of one of the arc furnaces can be taken at one time and the casting sequence can run independently.

The arrangement and sequence of apparatus beginning with the casting mold will follow very much the lines of the casting tower in use at Beaver Falls which is illustrated in this article, except it will not be as high and the space required for holding and pouring will be very much larger due to the greater quantity of metal that it will be handling in a production plant.

The production from the casting unit will be delivered in cut lengths either to a cooling bed or to reheating furnaces for conventional mills.

However, some additional development work will be required to bridge the gap from this present Beaver Falls unit to such a full scale commercial unit. This additional work would be limited to the testing of the holding furnaces suitable for production use and the development of controls which will enable the equipment to operate to its best advantage.

In addition to Republic and Babcock & Wilcox, there is elsewhere in the industry a sharpening interest in the possibilities of continuously-cast semifinished steel, sparked primarily by the prevailing unease over high break-even points and the doubled and tripled cost of new productive facilities. While, to be sure, Republic-Babcock & Wilcox lead the field, and have shown the greatest willingness to bide the time and spend the money to carry the investigation through its developmental stage and are the first to reach a commercial result, there are other developments in the art of continuous casting of steel. Irving Rossi, the dominant factor in the continuous casting of nonferrous metals, has devised an entirely new method of casting steel in hollow sections. His nonferrous machines are constructed on the Junghans patents, but this new steel machine branches out in completely new territory. National Tube Co. at Ellwood City, Pa., has been experimenting with such a unit for some months casting experimental lengths of 5 in. tubes. The tubes as cast are said to have a structure akin to cold-rolled steel. Right at the moment the unit is not in operation. There are two other steel casting units that have been in fitful operation since the author's last review of continuous casting in 1944. One, at Cold Metal Process Co., Youngstown, has so far had only one successful cast in 104 tries; the other, that of Norman Goss (see THE IRON AGE, Feb. 24, 1944) is at present relatively dormant, after some trial runs in the plants of American Steel & Wire Co., Empire Steel Co. and Braeburn Steel Co. Right now, an improved version of the machine is in another steel plant for further experimentation.

Also, the British, under grim necessity to modernize their steel producing facilities, are likewise being attracted by the labor and cost-saving potentialities of continuous casting. The British are quite familiar with the continuous casting of nonferrous metals and have several large Rossi-Junghans nonferrous units in use. But, in the case of steel, the British appear determined to go it alone for a while rather than to depend on American efforts. About a year ago (THE IRON AGE, Nov. 20, 1947) the British Iron & Steel Institute announced a program of studying the heat transfer from steel through mold walls by examining the variation of temperature with time after pouring steel into special fixed-position molds. This corresponds to the variation of the temperature with distance along the mold in the continuous casting process. A similar study is in progress to investigate the strains developed at various points on ingot mold walls following pouring, by using a thermocouple recorder of high scanning speed. So far, there has been no word from England to indicate that work has passed beyond this simple exploratory stage.

The author is, however, not unmindful of the fact that mention of all these various processes might lead to some confusion. Therefore, before entering into a detailed description of equipment and technique at the Babcock & Wilcox plant, it is best to attempt a brief historical review of victories and failures in the art of continuous casting.

Accumulated Skill of 100 Years

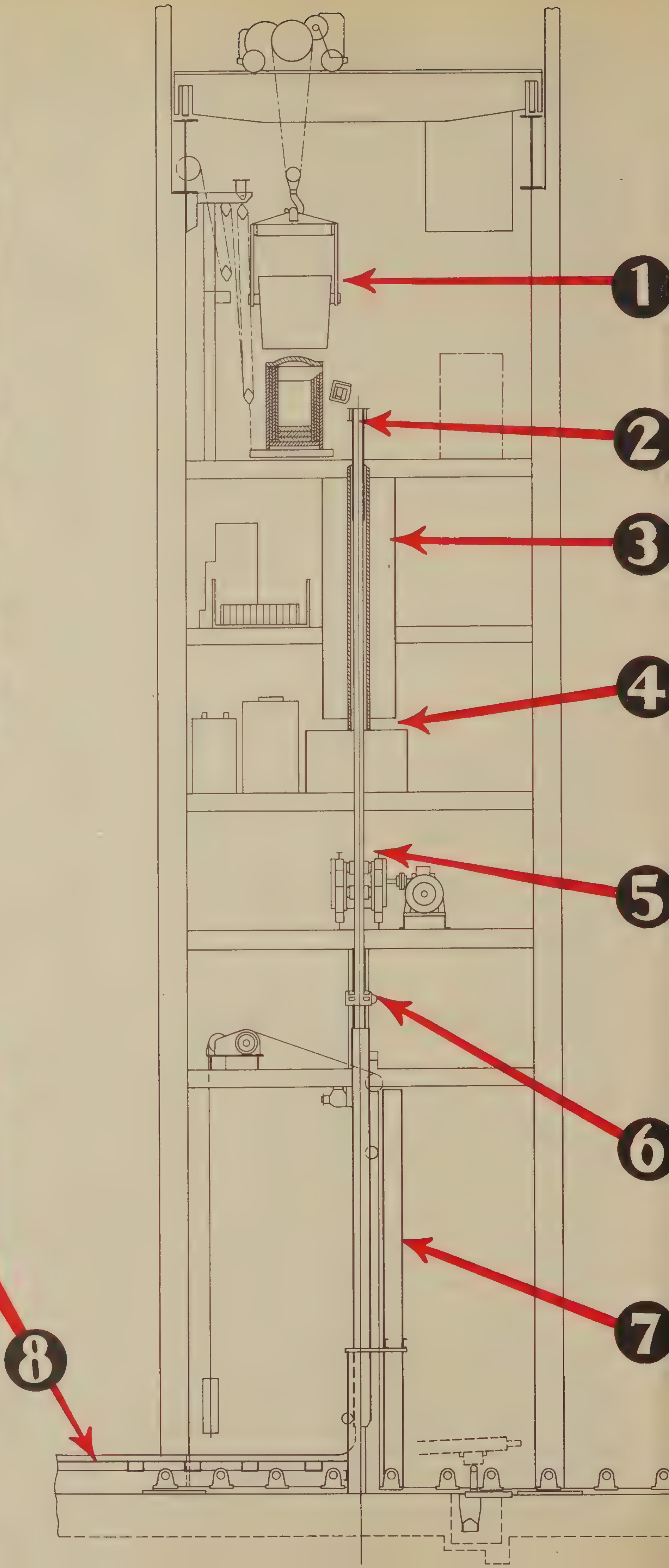
There has been little basic change since primitive times in the art of casting metal into forms as the initial operation to secure a finished product. The primitive made his crude mold, poured the metal therein, and extracted the casting for reheating and mechanically working it into some crude artifact. Today, in the most modern steel plant, the same basic principle is followed. Steel is poured into molds, a sizable discard is removed from the cooled ingot, and it is then reheated and wrought by hammering, pressing or rolling into intermediate or semifinished shapes. These are later shaped to finished form by various heat treatments alternated with periods of mechanical working.

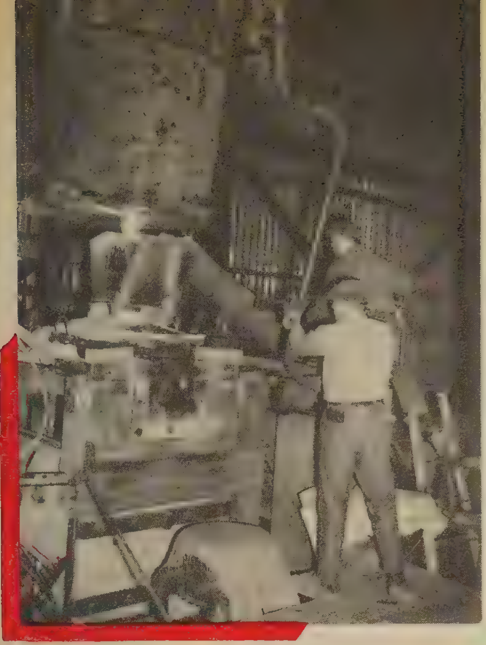
For some 100 years the inventive mind has been fascinated by the possibility of casting molten metal into one end of a simple fluid cooled mold and extracting from the other end a semifinished shape. The savings in equipment and labor are such as to excite the imagination. Some minds in the full flood of inventive frenzy have even conceived putting the continuous casting unit and the continuous mill together in one straight-line operation, with liquid metal being gulped into one end and the finished product spewing out the other. It's a great dream, but not for this year, or next, or the next.

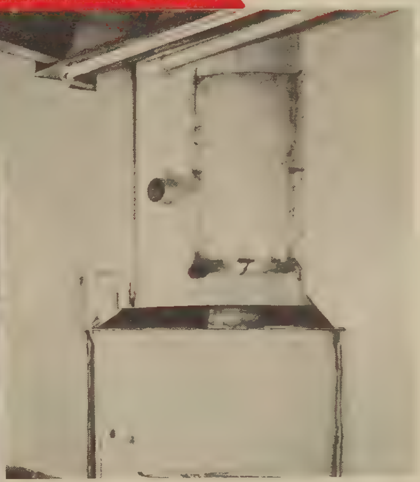
Many of the inventions of Sir Henry Bessemer have had a profound influence on the iron and steel industries over the past 100 years. Bessemer also believed in the potentialities of continuous casting, but his positive action in this direction was confined (in 1858) to the pouring of a few pounds of malleable iron between a couple of rotating chilled iron rolls. He got several dabs of ductile flat metal, and a small piece of this first effort still is dutifully preserved in the museum of the British Iron & Steel Institute. For those Americans who want to steam up a little nationalism about the matter, credit as father of the art could perhaps be assigned to J. Laing, who more than a decade earlier than Bessemer (1843, patent No. 3043), propounded the scheme of continuously casting soft metal tubing through a mold containing a vibrating mandrel. There's no evidence that any metal was made on such a machine, but the idea wasn't half bad, for today the American Metal Co., Carteret, N. J., uses a vibrating split mold for casting 3-in. sq copper wire bars. (But this same company has just purchased a Rossi machine to cast larger sizes, such as 6x18 in. copper slabs. One of the several immediate benefits to the company in buying this machine is the scrapping of some $2,500,000 of conventional water-cooled copper molds.)

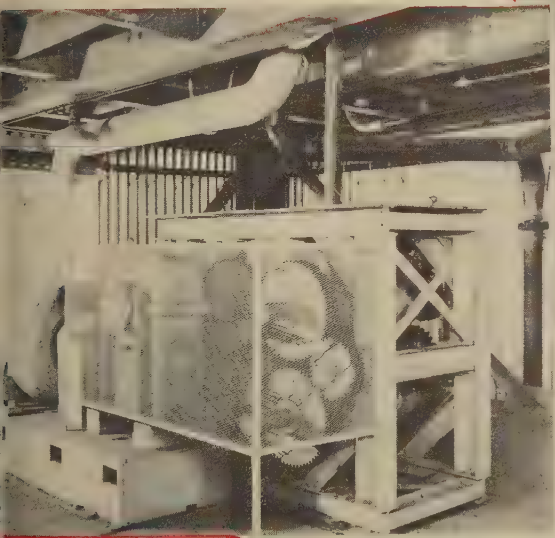
It doesn't make much difference at this late date as to whether Laing or Bessemer is credited.

STRAIGHT-LINE PRODUCTION *in the vertical manner. This 75-ft tower (above) houses B&W's equipment for continuously casting steel. Transfer ladles carry molten steel to the top of the tower--from there it passes down through the tower until lengths of semifinished steel are ejected at the bottom (at the point where the men are standing). A building only slightly larger than this could handle all operations, from scrap to semifinished steel, at the rate of some 12 or more tons per hr.*

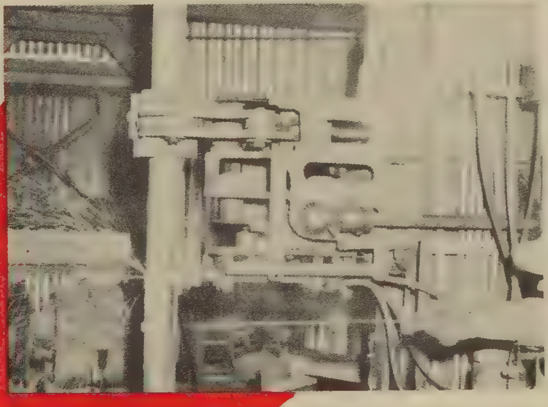








OPERATION SEQUENCE: *Molten steel is emptied from a transfer ladle (1) into an electric induction ladle, which tips to pour the steel through a tundish and thence into a water-cooled mold (2). The chilled billet passes from the pouring floor inside an insulating sleeve (3 and 4). Pinch rolls (5) control speed of billet, and an automatic acetylene torch (6) cuts billet to length. The cut billet (8) is lowered to a horizontal position by a cradle arrangement (7).*



with fathering the art. It is certainly true that continuous casting today more nearly resembles Laing's idea than Bessemer's, but it's also true that the British have proof of a cast of metal. It's hardly likely that either country will get stuffy about such a barren controversy. More likely it is that Russia will step in and Russianize the whole art for even as far back as 1937, J. G. Kullatschic, of the Sickle and Hammer plant, published an article assuming credit for the process. The data and pictures he used to establish this claim were lifted from THE IRON AGE without credit.

In any case, all through the turn of the century and in the early 1900s there was a growing conviction that nonferrous metals could be cast continuously through a water-cooled mold. Possibilities as regards steel were viewed with a dubious eye, one reason being its relative cheapness per unit volume of metal, the other being the high temperatures and sensitive casting characteristics involved. Uncounted scores of experiments were conducted with nonferrous metals, using every conceivable type of chilled metal rolls, split molds, vibrating molds, chains of molds on continuous belts, with infinite ingenious methods of pressing, sucking or pouring the metal through various horizontal, vertical or slanting arrangements. The idea was to get a relatively high speed, no sticking in the mold, no mold erosion, no segregation, and a fine and sound metallurgical structure. Invariably the ideas appeared to work out well on paper, but failed to function beyond that point.

Today's simple, fast and foolproof machine for continuously casting nonferrous metals is the fruition of many individual efforts and failures. Each man in a great galaxy of names nudged the art forward—Laing, Bessemer, Norton, Hodgson, Washburn, Stover, Daniels, Trotz, Atha, Bowley, Mellen, Poland, Eldred, Hazelett, Junghans, Rossi, Williams, Goss and Hopkins. They all mark the evolution of the art over a span of a century, and their work has been described in detail in THE IRON AGE, issues of Mar. 21, 1935; Oct. 15, 1936; April 4 and April 11, 1940; and Feb. 24, 1944.

Suffice to say, the continuous casting of nonferrous metals has for the past 10 years been routine industrial practice, whether it is the casting of a 1-in. copper rod or the casting of 6x24 in. aluminum slab ingot. Today, by far the bulk of all coppers and brasses and light metals passes through a variety of continuous casting equipment. Within 10 years, this striking upheaval in conventional casting practice has had dramatic repercussions in manhour productivity figures and in the amount of capital and space involved in productive equipment.

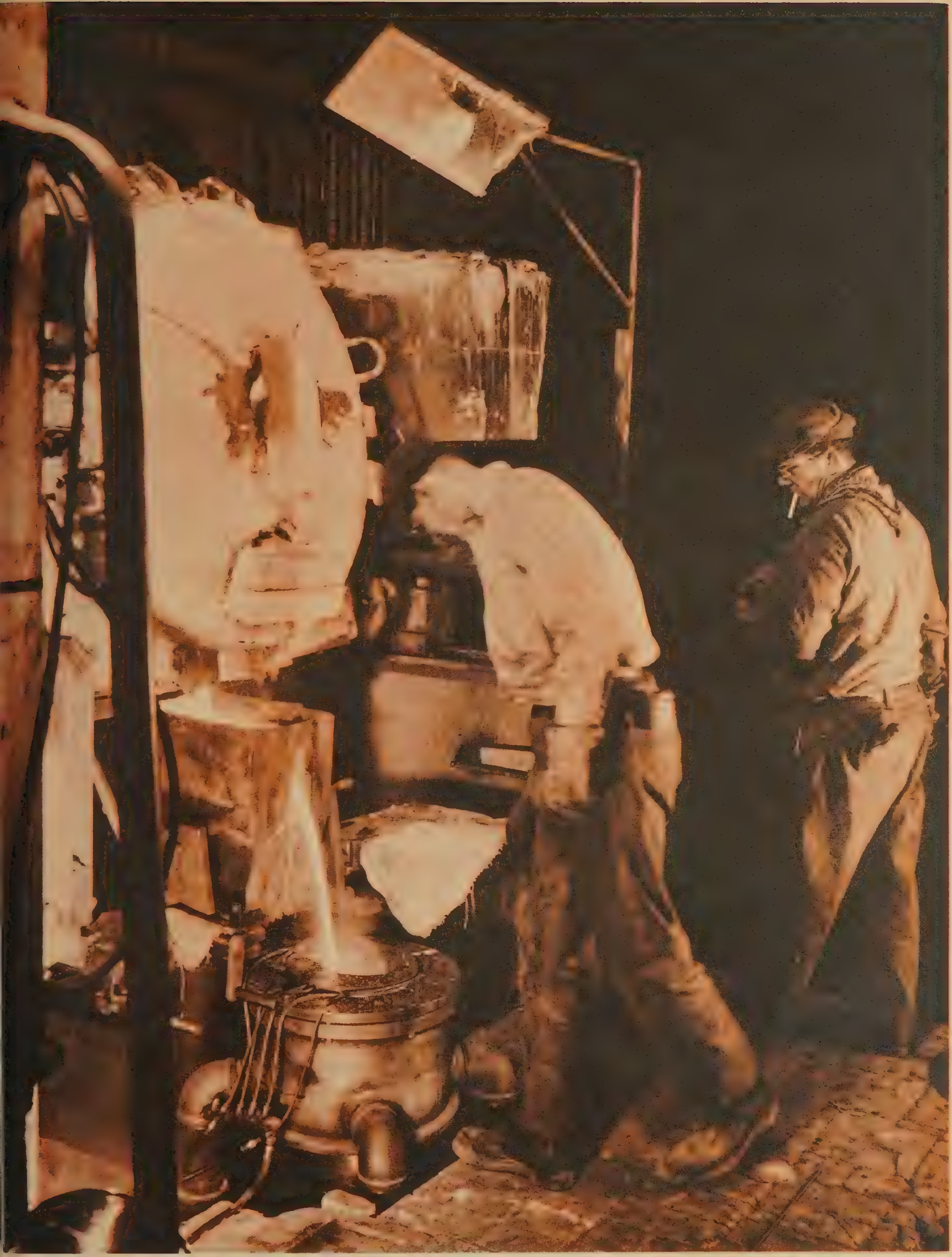
Considering the relative price of nonferrous metals to steel, and the relatively low melting temperatures of nonferrous metals, it is very natural that continuous casting first developed in the nonferrous field. However, it must be realized that had it not been for the ingenuity and years of effort that has resulted in the successful commercialization of continuous casting in the nonferrous field, that it is extremely unlikely that the more difficult field of continuous casting of steel would have ever been considered. Those people now working in the continuous casting of steel owe a great debt to their predecessors in the nonferrous field.

The continuous casting machine today (for nonferrous metal) is relatively a very simple and inexpensive machine. There are fine nuances in design that do not meet the eye, and these are the factors that spell the difference between success and failure. This evolution from a complex to a simple machine, and the potent influence of an inconspicuous design idea is rather typical of all industrial equipment. For instance, it was only John Tytus' idea of having his roll faces slightly convex, with each stand of slightly decreasing convexity, that lifted the continuous sheet out of a costly morass of failures.

The nonferrous continuous machine casts solids of many cross-sections through a short water-cooled mold. The mold usually is not over a foot in length, with water sprays below to keep the chilled surface solid and prevent bleeding (for the interior is still molten for some distance below the mold). A variety of means are used to regulate the flow of cast metal from the bottom of the mold, the idea not being to pull the casting from the mold but rather to regulate the speed of withdrawal and to prevent the casting from dropping out of the mold.

The Rossi-Junghans machine (the only one using a mold that reciprocates slightly, through a 1-in. cycle, or so) is probably the most versatile in the nonferrous field, with units scattered throughout the country and England. The Aluminum Co. of America's DC (direct casting) process probably handles the most tonnage of metal in the country, due to Alcoa's dominant position in the nonferrous field. Bohn Aluminum and Revere Copper & Brass license from Alcoa, and Dow Chemical and Reynolds Metals have machines of similar design. The American Smelting & Refining Co. and Chase Brass & Copper Co. use the Poland-Eldred process at Perth Amboy, N. J. (This unit will be described for the first time in detail in THE IRON AGE next week.) And, as previously mentioned, the American Metal Co. uses a vibrating mold arrangement for small sections at Carteret, N. J., which was devised by International Nickel Co. of Canada.

The typical continuous nonferrous metal casting unit turns out metal on a 24-hr basis. The capital cost of the machine is relatively slight, and it might occupy as little as 200 sq ft of floor space. This compares with the acres of casting floor and the uncounted millions of dollars worth of inventory tied up in individual water-cooled copper molds. Only three or four men may be required to operate a continuous casting unit, as against hundreds of men on a conventional casting floor. The operation is clean and orderly, whereas the practice it replaced was noteworthy for its fumes, smoke and disorder. The continuously-cast metal is actually of superior metallurgical quality; the surface is such as to require the lightest of conditioning operations, and mill return scrap vanishes to the



Continuously casting steel at a rate of 12 tons per hour.

irreducible minimum. Continuous casting has been a wealth-creating process of the first magnitude, and as such has been a worthy object indeed for the fruitful expenditure of time, effort and money.

But all this is for nonferrous metals, and the step-over into steel has not been a short hop but rather a seven-league hurdle. Only within the past few years has the steel industry evinced much interest. But now that the unit cost of steel is rising and tending to rise further, scrap and finished steel freight barriers are increasingly onerous, break-even points are dangerously high, and capital costs and productivity demands are pressing in with painful intensity, it is obvious that the inventive mind and the production men have had to work side by side in confraternity in order to carry the project through a long, difficult and expensive period of perfecting. Fortunately the project has arrived at a substantially perfected state at the opportune time.

The problems encountered in steel are legion compared with those for nonferrous metals. The metal temperature is far higher; the erosion, segregation, slag inclusion and safety factors are ever present and quite troublesome. But the Beaver Falls unit has shown that these factors are solvable and solvable in a relatively simple piece of equipment. Elsewhere in the industry, this success is attracting increasing interest, and it is to be expected that the steel industry eventually will find continuous casting as much an essential part of its operations as does the nonferrous industry.

The Mold's the Thing

The Beaver Falls casting unit casts two or three times per week, handling both carbon and alloy steels. A section of about 30 sq in. has been used in this work and is satisfactory for commercial use at a rate of 400 lb per min. It appears likely that a small amount of additional work on this section will add considerably to this rate. A mold for a cross-section of about 45 sq in. is now under construction to be used as a rolling stock for strip, tie plates, etc. Most of the development work done on the smaller section will apply for the larger so that it is expected the commercial casting rate in suitable quality will not take long to establish. This unit is located at the top of a 75-ft tower to which steel is delivered from the company's regular electric furnaces, and is lifted to the top of the tower in a transfer ladle. There it is poured into an inductively heated holding and pouring unit. This arrangement is the most functional for an experimental unit relying on an intermittent metal supply of 5000 lb per cast.

The mold and what goes with it is the principal center of attention, but by no means the only one in a continuous casting operation. The material from which the mold is made should have high heat conductivity. It is evident and even more important that the mold metal should not be wetted by the liquid steel, that is, the liquid steel in the mold must show a strong negative meniscus (like mercury in a thermometer). In watching the liquid steel in the mold at B & W Tube by a mirror arrangement (see accompanying illustration), the presence of this negative meniscus is itself the best indication at all times as to whether the mold surface is clean and the process is functioning properly.

The surface of the mold must be fairly smooth and it must remain smooth at all times during the casting operation. There is little friction between the surface of the mold and the molten metal. The art is filled with references to the necessity of lubrication of the mold, but it has now been found that it is possible and advantageous to avoid this step since lubricants are apt to make porous areas in the casting and tend by building up on the mold to promote sticking.

A small amount of hydrocarbon is introduced into the mold used at Beaver Falls, limited in quantity to only that necessary to combine with and thus eliminate free oxygen above the metal pool. Any oxide present at this point promotes the wetting of the mold by the steel and is, therefore, to be most carefully avoided.

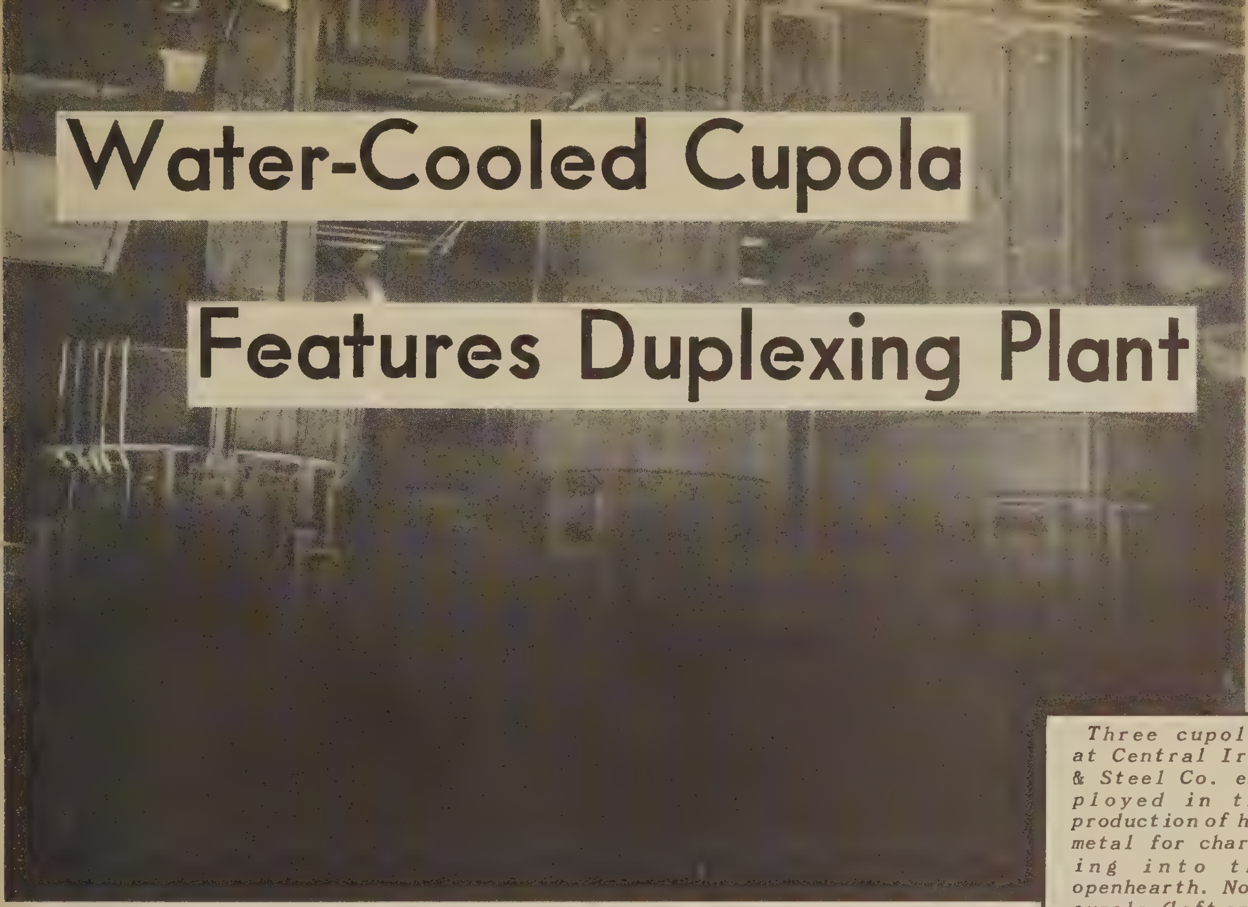
Shortly after the shell of the billet has been formed, the steel contracts and in so doing the billet shrinks away from the mold. The metal therefore is in contact with the surface of the mold for only a few inches, and only in this short distance can it lose heat to the mold by direct contact. Below the shrink point a relatively small amount of heat is absorbed by the mold being only that afforded by radiation and conduction. B & W has analyzed the gas in this gap below the shrink point and found it to be about 50 pct H_2. The presence of this H_2 is beneficial in aiding the rate of heat flow across the gap. The steel must, while it is in contact with the mold, gather structural strength as rapidly as possible to enable it to withstand the action of relative movement past the mold surface. This is the critical period for the formation of the surface. If the billet is well formed initially it will remain so unless damaged by other operations below the mold.

Proper cooling of the mold is essential and its importance increases as the casting rate is raised. The more rapid the casting rate, the greater the quantity of heat which must be absorbed by the surface of the mold. For a given set of cooling conditions, this means a longer period of time is required to cool the metal from the liquid to the frozen state and consequently the metal is in contact with the mold for a longer distance and more subject to disturbance by its movement against the mold.

One truism in still casting is that the more rapid the casting rate, the better the surface. In continuous casting, also, the more rapid the casting rate the better the surface. The metal must be brought into contact with the mold while the metal is at optimum viscosity. The cooling period, however, is limited, measured both in time and in distance of contact with the mold, by the casting rate. Therefore, the metal must

(Continued on page 159)

Water-Cooled Cupola Features Duplexing Plant



Three cupolas at Central Iron & Steel Co. employed in the production of hot metal for charging into the openhearth. No. 3 cupola (left end) is the water-cooled lining type designed for six months refractory life.

Featuring water cooling of the lining, unusual tuyere design and increased blast pressure, a modified cupola has been installed at the Central Iron and Steel Co. as a source of hot metal for the openhearth furnace. Resembling a miniature blast furnace more than a cupola, the unit is intended for some 6 months' uninterrupted service between refractory repairs. The author presents herein a description of this cupola and indicates performance data obtained to date.

By E. S. KOPECKI
Metallurgical Editor,
THE IRON AGE

STRIVING to overcome raw material shortages currently facing the steel industry, particularly the nonintegrated plants, Central Iron and Steel Co., Harrisburg, Pa., a subsidiary of Barium Steel Corp., has undertaken an investigation of the possibilities of the use of cupola hot metal for openhearth steelmaking operations. The experimental program, already well under way, centers around a modified cupola construction, designed for some 6 months of continuous operation.

Central Iron and Steel manufactures rimmed, semikilled, and forged quality steels. Increasing difficulties in obtaining pig iron have forced the plant, formerly a cold metal shop, into operating cupolas to produce hot metal for charging into the openhearth. With two cupolas operating alternately, it has been possible to produce from 7000 to 9000 tons of hot metal per month. Current production practice cycle is set up at 48 to 64 hr operation and 36 hr down for refractory repairs. By running one cupola while the other is down for patching, continuous production of hot metal is obtained.

This process has offered advantages to the extent that a substantial increase in steel production has been attained, due to the reduction of openhearth heat time over former cold scrap methods. Also significant, from an economic standpoint, are the corresponding openhearth savings in fuel and refractories.

Although the use of cupola hot metal in the manufacture of openhearth steel offered such attractive features, certain design changes appeared desirable in the construction of the cupola units. It was felt that although these particular cupolas already operated continuously, many times longer than conventional foundry cupolas, possibly a still longer refractory life could be achieved. The manhours consumed in patching a cupola that has run continuously for some 50 hr are considerable, and it was apparent that any reduction made in downtime would produce direct savings in conversion costs.

A new cupola was therefore constructed, with Lewis B. Lindemuth, New York, as consulting engineer, incorporating certain design changes, which are shown in the accompanying illustrations. Installation of this No. 3 unit adjacent to the other two cupolas has made possible the utilization of the hot metal produced in the course of experimentation as a supplement to the output of cupolas Nos. 1 and 2.[1] The general construction features of the new cupola, as originally designed, are indicated in fig. 1. Changes have since been made, as dictated by experience, towards a goal of maximum production rate and efficiency and will be discussed in the following text.

It is the hope of company officials that an operating life of some 6 months, minimum, will be achieved before a shutdown for patching is required. Time alone will tell as to the complete, or partial, success of this venture. To date the unit has operated for an accumulated total of 10 days (intermittent operation) and although the results obtained in this short period are not

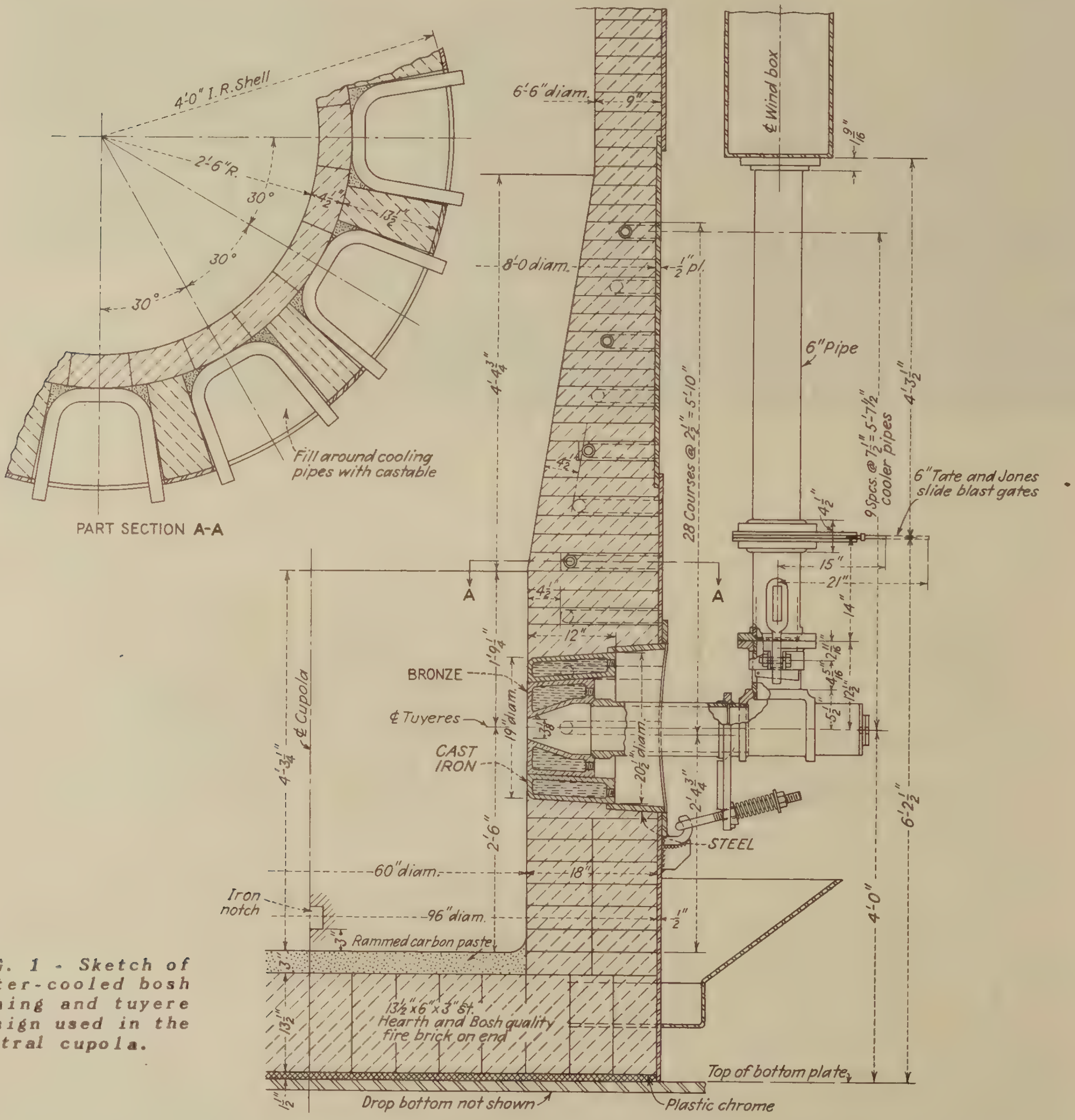

4'-0" I.R. Shell
2'-6"R.
30°
30°
30°
4½"
13½"
Fill around cooling pipes with castable
PART SECTION A-A
6'-6" diam.
9"
℄ Wind box
9/16"
8'-0 diam.
½" pl.
4'-4¾"
28 Courses @ 2½" = 5'-10"
6" Pipe
9 Spcs. @ 7½" = 5'-7½" cooler pipes
4'-3½"
6" Tate and Jones slide blast gates
4½"
4½"
15"
21"
A
A
14"
4½"
12"
BRONZE
1'-9¼"
℄ Tuyeres
19" diam.
CAST IRON
20½" diam.
2'-4¾"
STEEL
℄ Cupola
4'-3¼"
2'-6"
60" diam.
18"
Iron notch
96" diam.
½"
4'-0"
6'-2½"
Rammed carbon paste
3"
13½"
13½"x6"x3" St. Hearth and Bosh quality fire brick on end
Top of bottom plate
½"
Drop bottom not shown
Plastic chrome

FIG. 1 - Sketch of water-cooled bosh lining and tuyere design used in the Central cupola.

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[1] *Four plants are understood to be utilizing cupolas similar to Nos. 1 and 2 in producing hot metal for charging into the openhearth furnace. In a subsequent issue, the operations at Sheffield Steel Corp., Kansas City; Stanley Works, Bridgeport, Conn., and Central Iron and Steel Co., Harrisburg, Pa., will be described.—Ed.*

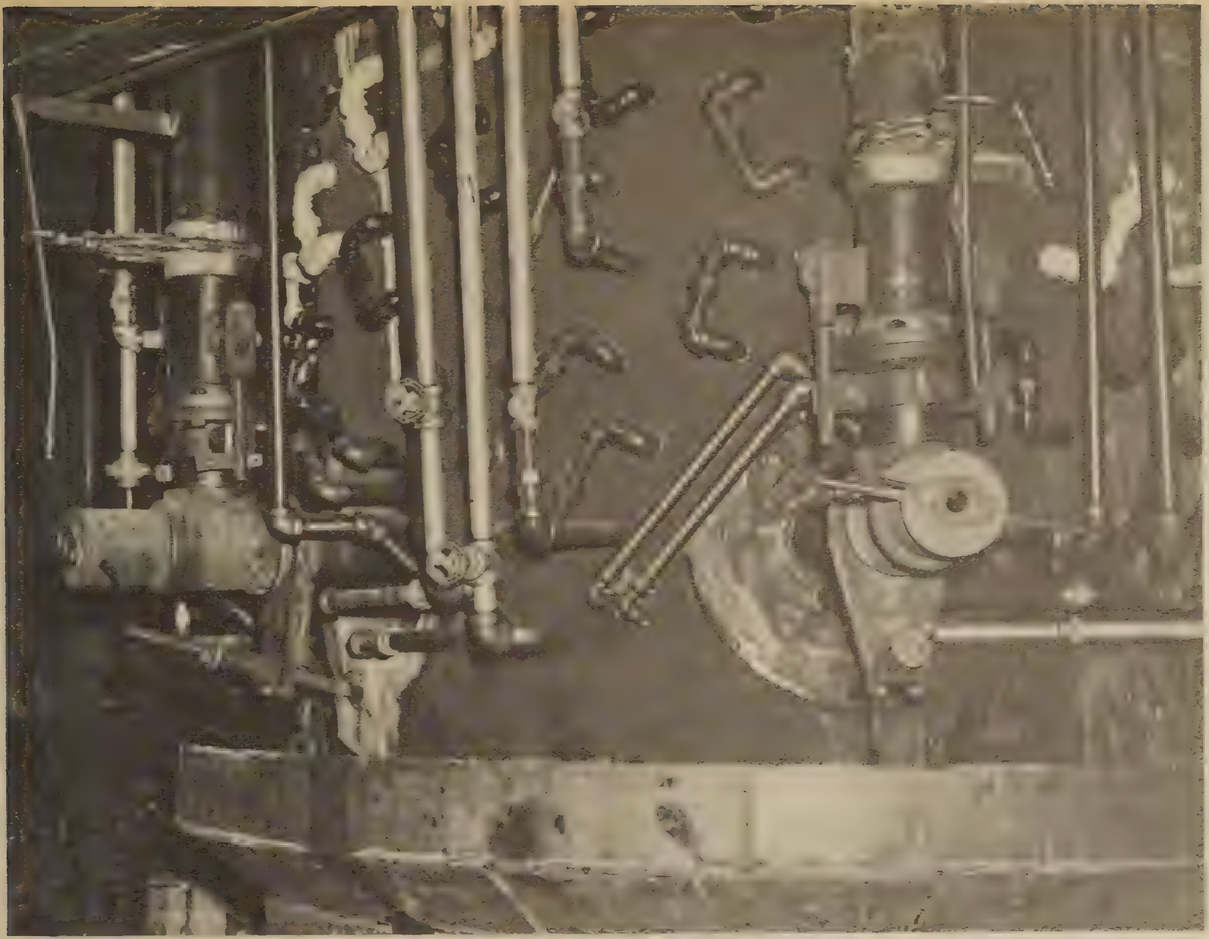

FIG. 2 - Closeup view of cupola at tuyere level illustrating the water cooling piping arrangement and tuyere design.

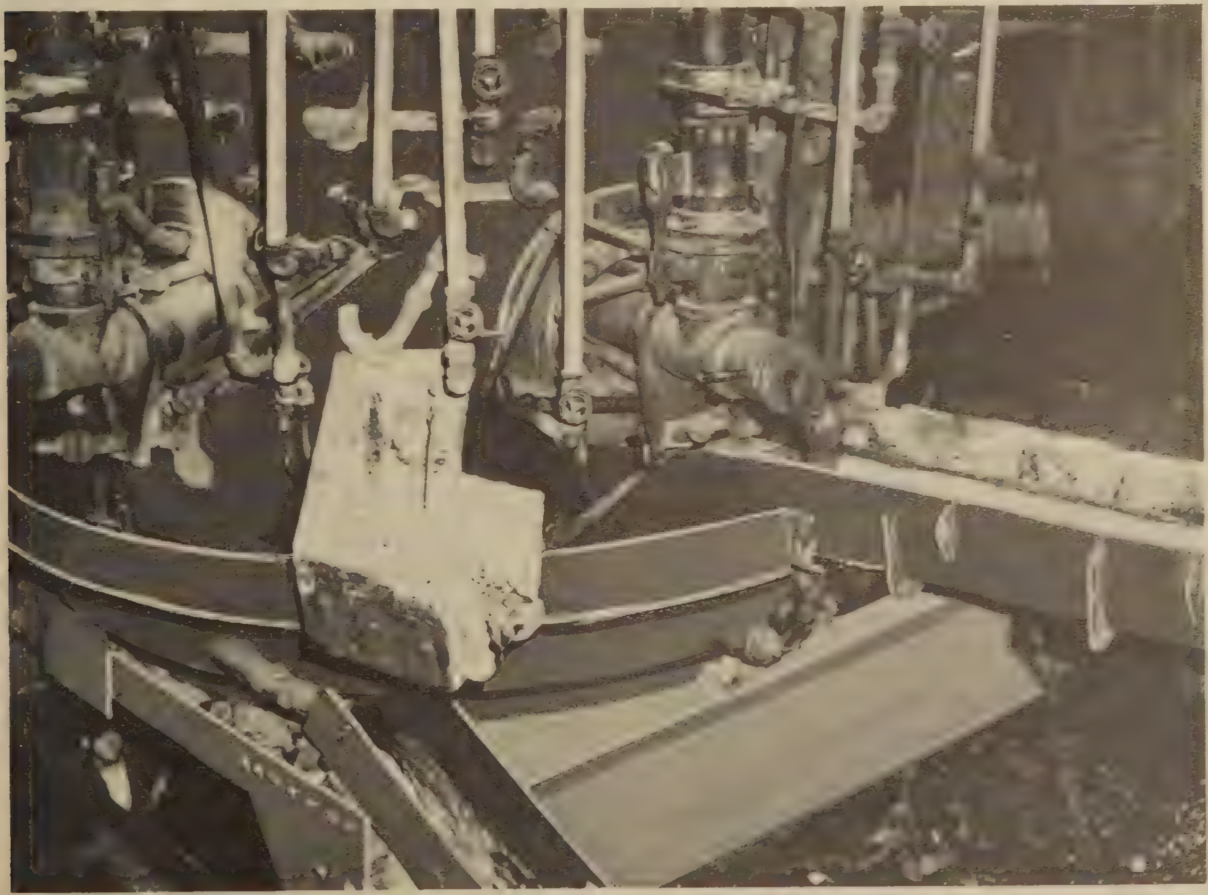

FIG. 3 - Closeup view of cupola showing location of slag hole.

conclusive, indications are promising. A critical, internal visual examination after each operating cycle has revealed a complete absence of lining and bottom burnout after the 10th day (accumulated)—which total already represents more than twice the operating period of each of the adjacent cupolas between repairs.

The design incorporates the following significant features:

(1) Water cooling of cupola bosh lining.
(2) A tuyere design that represents a departure from conventional cupola design.
(3) Utilization of increased blast pressure.
(4) Use of carbon paste on well bottom.
(5) Permanent bottom instead of drop bottom construction.

The piping for the water cooling system is illustrated in figs. 1 and 2, and extends, through eight inlets, just above the tuyeres upwards over a distance of about 4 1/3 ft. The cooling system extends into the lining at about 5-in. intervals to within 4½ in. of the inner lining surface. It is anticipated that the cooling effect will be sufficient to greatly minimize the accelerated erosion usually encountered with overheated refractories.

The tuyere design represents a complete departure from conventional cupola construction. What is usually merely an opening in the lining (2x4 in. is a typical cross-section) is, in this cupola, an assembly of accurately machined components. The steel, cast iron and bronze tuyere sections (the latter two are water-cooled) are tapered slide fits and prevent the escape of air blast between the shell and the lining.

Originally the tuyeres, of which there are six, projected some 6 in. beyond the inner lining. This was considered unsatisfactory, since, due to the exposure of the water-cooled bronze tuyere surface, a drop in temperature of cupola metal was experienced. A subsequent modification, whereby the bronze component was moved back, flush with the inner lining, has resulted in an increase in hot metal temperature with no apparent adverse affect on blast penetration.

Ths tuyere design makes possible the efficient use of higher blast pressures than normally used. Although the present experimentation involves the use of 10,500 cfm of air at from 32 to 40 oz pressure, much greater pressures can be applied if necessary.

This value of 40 oz remains constant throughout the operating cycle and makes possible certain advantages. For example, satisfactory byproduct coke is becoming increasingly difficult to obtain. Beehive coke is not a suitable alternate for cupola operations; it is too fine in particle size to permit sufficient penetration of blast at low pressures (24 oz max). It is anticipated that the 40 oz pressure will not only give the required blast penetration for the beehive coke, but will also make possible the use of blast furnace coke, which is less costly than both the beehive and byproduct grades.

The cupola bottom is built up with 1½ in. of plastic chrome refractory, 13½ in. hearth and bosh quality firebrick, and 3 in. rammed carbon paste. Examination after several experimental runs has disclosed no wear on the carbon bottom. Nor is wear of any nature anticipated, what with a 3 in. deep well of metal contributing to the protection of the bottom.

In operation, a coke bed of about 60 in. above the tuyeres is first built up. The first three charges are then introduced, consisting entirely of cast iron scrap, which insures a faster melt to start with. Subsequent charges are then made, each consisting of 2000 lb steel scrap, 1000 lb cast iron scrap, 350 to 500 lb coke and 70 to 100 lb limestone, although this procedure is occasionally interrupted with additions of a coke booster as required to maintain coke bed depth. It is expected, however, that forthcoming improvements will make possible an increase in steel:cast iron ratio.

A typical composition of the hot metal produced is as follows: 2.85 to 3.00 pct C, 0.45 pct Mn, 0.200 pct S, and 1.00 pct Si. Yield values range from 94 to 97 pct, and the coke ratio (using beehive coke) runs from 5:1 to 6:1.

Whereas the two adjacent cupolas are designed for continuous tapping, cupola No. 3 is tapped intermittently—about 4 tons every 20 min. This is not particularly desirable, since a holding ladle is not available, and the hot metal is tapped directly into 40 ton ladles, desulfurized and charged into the openhearth. The several hours required to fill the tapping ladle invariably results in metal loss from ladle skull due to the drop in temperature of the molten iron, particularly when tapped in such small quantities.

It would be preferable to tap at longer intervals, say 12 or 13 tons every hour rather than 4 tons every 20 min. Steps are now being taken to make this possible. An inspection of fig. 1 will indicate that the vertical distance from the bottom of the tap hole to the bottom of the tuyeres limits the amount of metal that can be tapped at one time to the approximately 4 tons previously mentioned. By lengthening this distance to say 40 in. (conditions at Central Iron and Steel Co. permit this modification) the volume that can be tapped at one time will be tripled. Hence the time interval between tapping can be lengthened to 1 hr, without decreasing the production rate.

An explanation would probably be in order at this point to touch upon the fact that cupola No. 3 taps intermittently, while Nos. 1 and 2 tap continuously. This feature, while not particularly advantageous, is deemed necessary to attain longer operating time. In the process of making cupola hot metal for charging into openhearth furnaces, it is necessary to separate, to a considerable extent, the slag and the metal so that the slag does not enter the ladle.

To accomplish this separation (in continuous tapping cupolas Nos. 1 and 2) the initial metal flows from the tap hole into a well and fills it to a level equal approximately to that of the molten metal within the cupola. The slag then rises to the top of the well and runs into a stream of water for subsequent removal, while the heavier iron is drawn off through an intermediate opening in the well wall.

This, of course, means that the tap hole refractories are continually in contact, both inside and outside the cupola, with the flowing molten metal and slag. The resulting erosion effect not only wears away the refractories in a horizontal direction, but also enlarges the tapping hole diameter to the extent that the blast pressure must be gradually reduced, from about 22 down to 12 oz.

In the case of intermittent tapping, no well outside the tap hole is required and the separation is performed within the cupola hearth. The slag remains at the top of the accumulation of molten metal so that, when the tap hole plug is removed, the iron is discharged first. Then, when the slag begins to exit, it can be detoured into a slag sump.

This technique was followed in the early experimentation, but it soon became apparent that optimum slag-metal separation was not being obtained. To remedy this condition, a slag hole was constructed, see fig. 3, to allow for slag removal without the need for turning off the blast. In this manner, melting of metal can continue while slag removal is underway. Furthermore, since the bath volume of molten metal and slag is limited by the height of the hearth up to the tuyeres, removal of the slag makes possible an accumulation of a greater percentage of metal in the hearth.

The exiting slag falls into a stream of water, as shown in fig. 3, and is carried to a slag sump for subsequent removal.

The ability to eliminate the need for a separation of slag and metal outside the cupola makes possible the minimizing of erosion around the tap hole. As an added protection measure, the tap hole is lined with Graphtex brick, which is a mixture of graphite and clay.

Operations to date have revealed no appreciable erosion effect at the tap hole, but it is anticipated that when the more exacting conditions of continuous operation are encountered, intermittent repairs will probably be required. On the basis of past experience, it is expected that these repairs will be of a minor nature and will not interfere with melting operations.

Cold Welding Aluminum

ALUMINUM can be joined effectively by cold welding, the procedure being to apply pressure to the material with a tool designed to cause controlled deformation of considerable extent. The method involves two processes, the first being cleaning and the second the application of pressure.

In the July issue of *Light Metals*, an English publication, it is reported that the method was developed by the research dept. of General Electric Co., Ltd. Of primary importance in the process is a direct and intimate contact between the metallic surfaces to be welded. All surface contamination must be removed, including the oxide film. Moreover, this cleaning must be accomplished in such a manner that nothing is left on the prepared surfaces. Chemical cleaning methods have been found unsuitable, and such mechanical methods as filing and treatment with abrasives have also proved unsuccessful.

It has been found that good welds are obtained by using a power-driven rotary scratch brush with a surface speed of about 3000 fpm. The brush must be in contact with the work long enough to make the drag felt, which occurs when the steel bristles break through the oxide film and seize on the metal surface below. As the brush rotates, dust is thrown clear of the work and an open dust-free surface results. Prior degreasing is often advisable.

While there is some instantaneous oxidation of the surface, the brush cleaning will give a surface that will permit cold welding up to 24 hr after treatment. Grease from fingers, moisture and similar forms of contamination will render the welding operation ineffective.

Special tools have been designed which will deform the material by a fixed amount. They may be in the form of a simple tooth to produce the equivalent of a spot weld, a wheel to produce a seam weld, or an annulus to produce a circular weld. The simplicity of the process is appreciated when it is realized that the simple spot-weld can be produced by a hand press, with a pair of suitable pliers, or even with a punch and hammer.

A number of materials other than aluminum have been welded by this method and a figure of merit has been calculated to indicate the suitability of the process to a particular metal. The figure represents the maximum percentage of the double thickness of metal which can remain when a good weld has been made. The most satisfactory applications are with aluminum alloys and copper. High-purity aluminum has a figure of merit of 40; commercially pure aluminum, 30; and alloys containing 1.25 pct Mn between 20 and 29. With aluminum alloys, not more than 3 pct of Mn or Si can be tolerated. Lead, copper, nickel, zinc and silver have figures of merit of 16, 14, 11, 8 and 6, respectively.

Heat treated alloys can be welded in the soft condition and subsequently allowed to harden. Work hardening has the effect of improving the strength of the welded metal. One example pointed out is in that the ultimate tensile strength of a half-hard alloy was about doubled by the work hardening and by the proper design of weld it is possible to arrange that the joint is as strong as the original section.

Whether or not grain growth takes place has not been established and if it does, doubt exists as to whether it could be established that this happens during or after actual welding. There is no explanation of how welding takes place by this method, but it has been demonstrated that cold welding by pressure is practical.

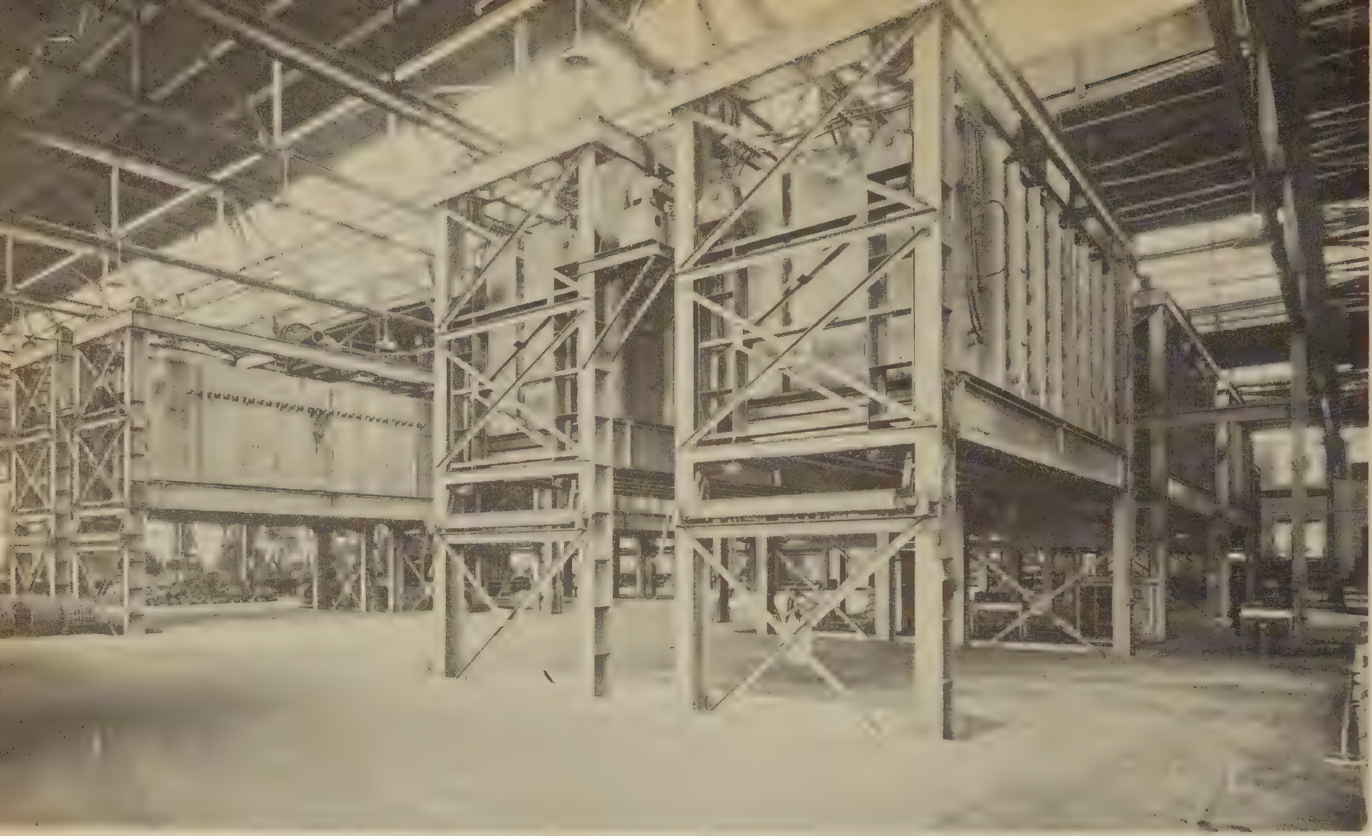

FIG. 1 - Installation of 12 GE elevator electric furnaces for annealing malleable iron castings, consisting of six groups of two furnaces per group (one high-temperature and one low-temperature). Car Loading platform is 5 ft 7 in. wide, 21 ft 10 in. long. Loading height 52 in. (approx 16 net tons per charge).

Annealing Malleable Iron

By E. G. BILLHARDT
Plant Engineer,
Lake City Malleable, Inc.,
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CAPABLE of annealing 100 net tons of malleable iron per 24-hr day, the electrically-heated elevator furnaces at Lake City Malleable, Inc., possess several desirable features, including close control over temperature conditions, economy in operations, and the ability to anneal a wide range of sizes and shapes of castings.

To date castings have been annealed simultaneously, varying from ¼ to 2½ in. in thickness and from ½ to 375 lb in weight, with no apparent nonuniformity in metallurgical results. It is significant that in 4 years' operations, less than 50 tons of iron castings have required reheat treating due to a faulty anneal.

The complete annealing installation consists of 12 large furnaces each with loading dimensions of 5 ft 7 in. wide x 21 ft 10 in. long x 52 in. high, and two small furnaces each with loading dimensions of 4 ft 3 in. wide x 8 ft 6 in. long x 33 in. high. The furnaces are arranged in pairs, where one is a high temperature furnace for the high temperature portion of the annealing cycle and the other a low temperature furnace with an auxiliary cooling system and program control for the low temperature portion of the cycle.

The large furnaces have a nominal loading of 16 net tons. The actual loading varies between 14 and 18 net tons (average 16½ net tons) depending on the size and shape of the castings. The smaller castings are loaded in light-weight heat-resisting alloy containers which in the larger furnaces are loaded two wide, two high and eight long or 32 containers per car. Each

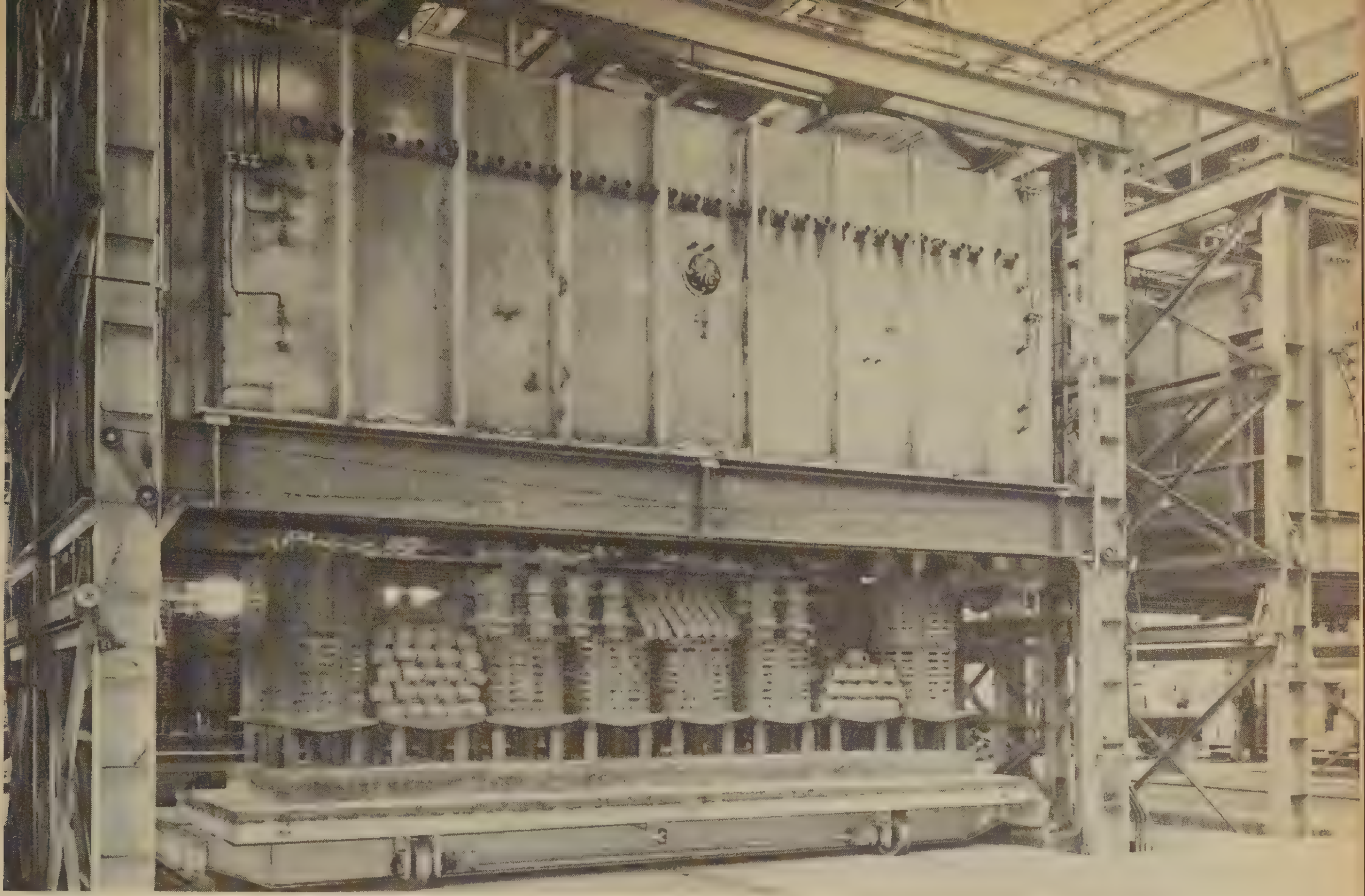

FIG. 2 - View showing loaded car which has just been removed from low-temperature furnace.

Castings . . .

Featuring accurate and automatic time-temperature control, economy in operation, and flexibility in simultaneously annealing wide ranges of sizes and shapes of parts, the annealing furnace installation at Lake City Malleable typifies the advantages of electrically-heated elevator furnaces for annealing malleable iron castings. A description of furnace construction is presented in this article, supplemented with cost and production data.

container weighs approximately 250 lb and loads 1000 to 1100 lb net per container. The larger castings may be loaded directly on the car loading platform without any containers.

Four of the larger furnaces are arranged in line over one set of car tracks and a car puller chain. Five cars are provided with the four furnaces, thereby allowing one car outside for cooling and reloading (see fig. 1).

The scheme of operation of a pair of furnaces is as follows: After completion of the heating and holding time at the high temperature in the high temperature furnace, the loaded car is removed and transferred, immediately, to the low temperature furnace where the charge is quickly cooled to the required temperature by means of an auxiliary cooling system. The charge is then slow cooled for the required time, with the cooling rate being controlled by the program control equipment.

Movement of the car is by means of a car puller chain which is motor driven; therefore, the operator can control the movements of the car at some distance from the furnaces. The car-pulling chain is automatically engaged with the car, or disengaged, as the car is lowered out of the furnace or elevated into the furnace.

One of the important features of the electric furnace is the elevated hearth construction of the car, shown in fig. 2. This hearth consists of cast alloy grids supported by cast alloy posts which are hollow and extend down through the brickwork of the car to the steel frame. This construction elevates the charge a proper dis-

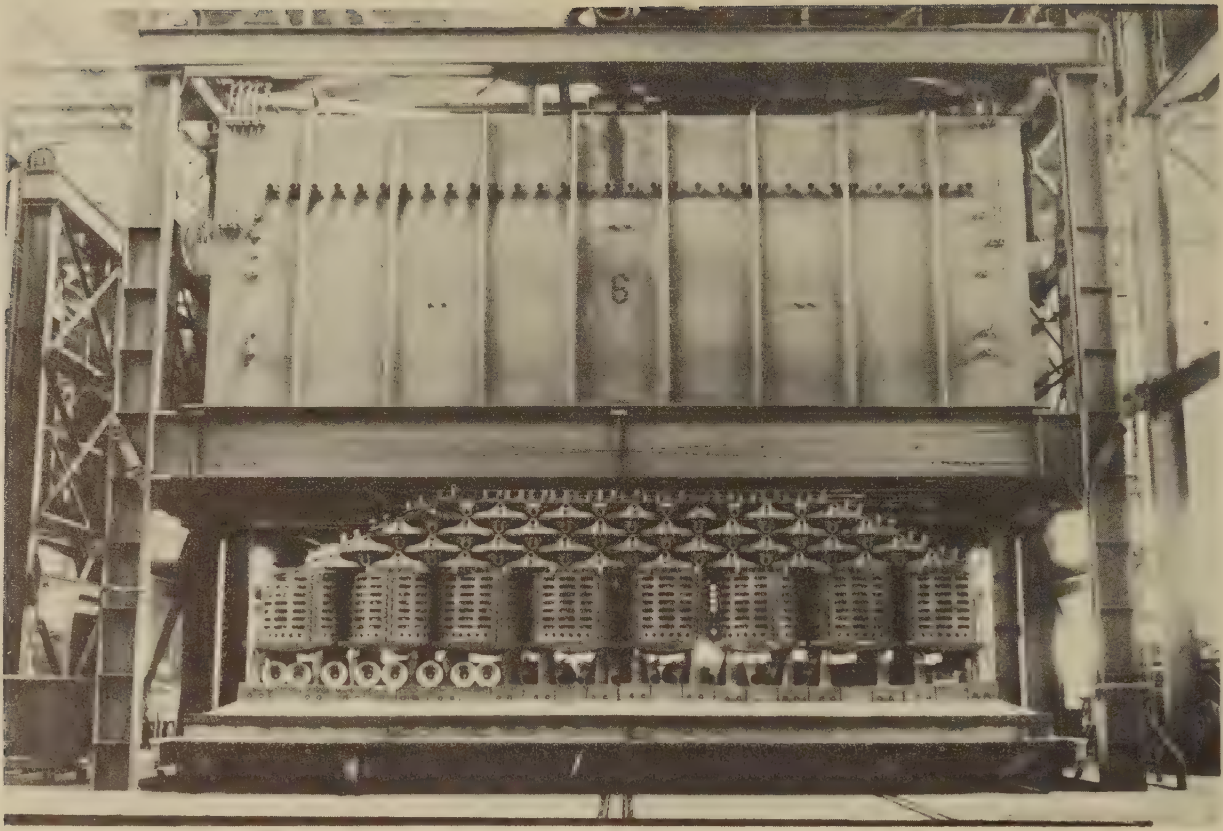

FIG. 3 - View showing car loaded with small castings packed in baskets and large castings stacked on top of baskets. Net weight of castings on this car was 15½ tons.

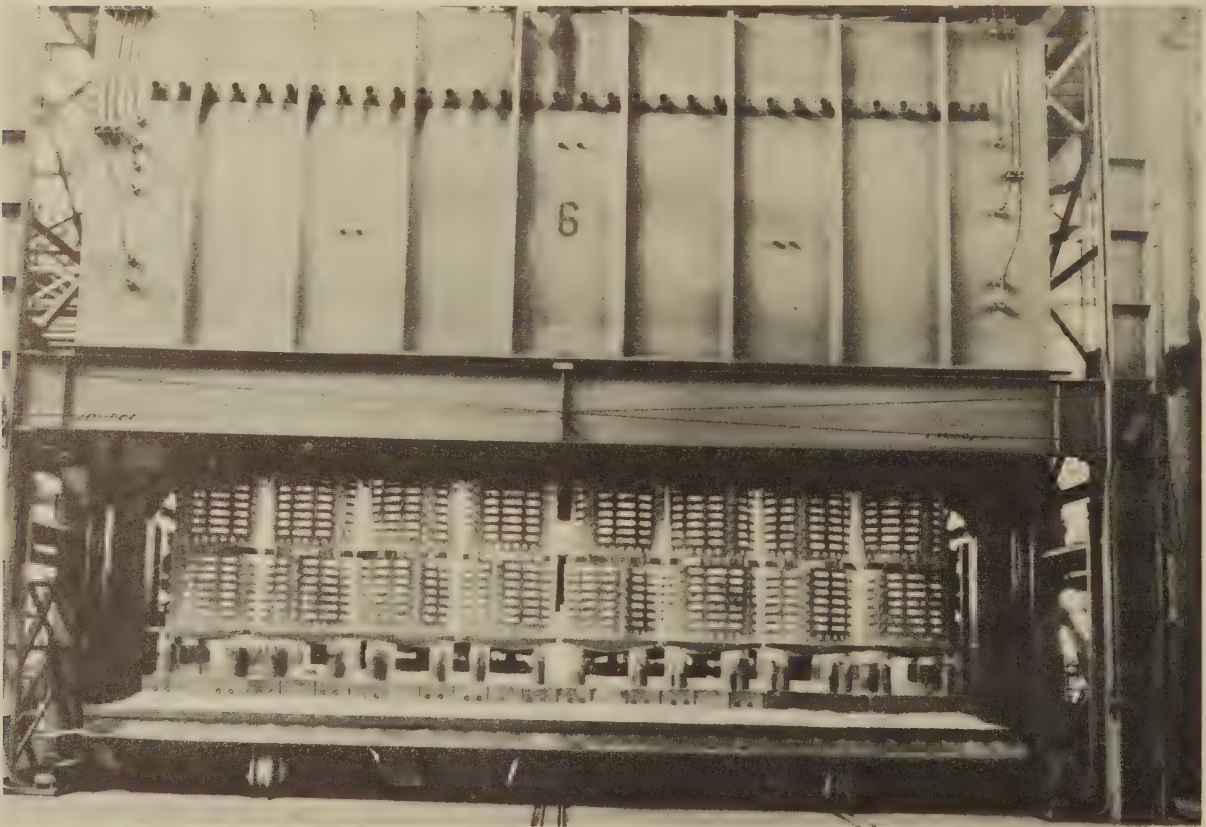

FIG. 4 - View of car just going into low temperature oven. Car temperature is about 1600 F at this part of changeover from high to low temperature ovens.

tance above the brickwork of the car, thereby (1) insures rapid and uniform heating of the charge, (2) uniform cooling of the charge, and (3) eliminates the use of heavy refractories on top of the car, resulting in less heat absorbed by the car, which means better economy of operation and quicker heating and cooling.

With these 12 large furnaces, 100 net tons of malleable iron can be annealed per 24-hr day.

The containers in which the castings are loaded are made of standard 35-15 Cr-Ni alloy and have been in operation for 4 years and are still in excellent condition. At the time the installation was made, it was estimated that the operating cost would be approximately $1.00 per net ton of castings annealed and the 4 years' operation to date indicates that this figure will be met.

Maintenance to date has been almost negligible, approximately 15¢ per net ton of castings annealed; there has been no replacement of the heating units or any of the alloy components on the cars and the heating units and alloy cars are in excellent condition.

The direct labor cost for loading and unloading of the castings in the annealing room is $1.00 per net ton of castings annealed.

The average energy consumption has been 375 kw per hr per net ton of malleable iron castings annealed. With continuous operation 7 days a week, the energy consumption would drop to 340 kw per hr.

Description of Furnaces

Each of the high temperature furnaces has a total electrical rating of 820 kw divided into four separately controlled circuits. Each low temperature furnace has a rating of 300 kw divided into three separately controlled circuits. All circuits are for 460, 3 phase, 60 cycles.

The low temperature furnace rating of 300 kw was provided so that these furnaces may also be used for reheating the charge after cooling outside when pearlitic iron is to be produced. The entire time-temperature cycle is automatically controlled by means of the Leeds and Northrup Micromax temperature control instruments.

The control of the low temperature portion of the cycle is of interest. Each low temperature furnace is equipped with heating units as well as an auxiliary cooling system. This cooling system consists of centrifugally cast alloy cooling tubes, located in the top of the furnace and extending through the side walls of the furnace. One end of each tube is connected to a common header to which is connected a motor-driven blower, and the cooling is automatically controlled by starting and stopping the blower.

When the hot charge is transferred from the high temperature furnace to the low temperature furnace, the auxiliary cooling system functions automatically. It is started by means of a thermocouple located in the top of the furnace which is connected to the program control instrument. This instrument is set at the required setting, approximately 1400°F, and the cooling is thrown on and off as required to maintain that setting, until the charge has cooled down, and equalized at the temperature as set on the car thermocouple.

The car thermocouple extends up through the car so as to indicate approximately the temperature near the center of the charge. It is connected to a separate instrument that records the car thermocouple temperature and automatically starts the program cooling part of the cycle when the car couple has cooled to the selected temperature setting. Then the program instrument takes over and automatically sets down the temperature a few degrees per hour (this cooling rate is readily adjustable by means of the calibrated dial on the control panel). During this program cooling cycle, the program instrument automatically throws the cooling blower, or heating units, on and off, as required to maintain the cooling cycle as set by the operator.

Figs. 2, 3 and 4 indicate the views of the various sizes and shapes of parts that are heat treated.

Some of the principal advantages that have been realized in the use of these electric elevator annealing furnaces are:

(1) Accurate and automatic control of the time-temperature cycle.

(2) Uniform results of physical properties of the castings.

(3) Short annealing cycle; therefore saving in floor space, shorter deliveries and less inventory of castings in process.

(4) Excellent working conditions. This foundry is an unusually modern, clean and comfortable place in which to work.

(5) Lower overall cost of annealing as indicated by the information given on energy consumption, maintenance, container cost, etc,

Bronze Coated Steel Gears

COATING of steel gear wheels with bronze by a casting process during the war was claimed by the Germans to produce gears of greater strength and longer life which were generally superior to solid cast gears, especially for military equipment where shock was a factor. A shortage of tin led to this development and although production was more expensive, life of the bronze coated gears produced at one foundry was said to be double that of the solid bronze gear. The techniques involved are described in a report by Sam Tour (No. PB 17565) that is available from the Library of Congress, Washington 25, at a cost of $1 for photostat and 50¢ for microfilm.

A special bronze was used for the coating and gas heated furnaces employed for melting. The gear was placed on a gray cast iron mold lined with fire clay with a heavy iron ring placed on top. The bronze was cast into the annulus between the gear and container. After cooling, the bronze coated gear was removed and packed in a graphite sand mixture. This was followed by diffusion heat treatment and final machining.

Metal Oxide Films at Elevated

Utilizing the reflection electron diffraction technique in studying the structures of oxide films on metals at elevated temperatures, the author has conducted an intensive experimental investigation in an effort to determine the surface stability characteristics of 20 selected metals and alloys. The results of the study are given in this concluding part of a two-part article, on the basis of observations made (1) at the elevated temperatures, and (2) following heating and cooling of oxidized specimens. The author also presents a correlation of his data with the works of other investigators.

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THE oxidation of some of the alloys listed in table I (THE IRON AGE, *Aug. 12, p. 92*) have been investigated by other workers using electron diffraction.

Kornilov and Sidorishin[22] have presented an electron diffraction investigation of the oxidation of an alloy (70 Fe, 25 Cr, 5 Al) in the temperature range 400° to 1000°C (752° to 1832°F). At low temperatures an isomorphous mixture of aluminum, iron and chromium oxides with a cubic structure of the spinel type forms on the surface. With increasing temperature the lattice parameter of this oxide decreases, until at 1000°C it approximates the lattice constant of gamma Al_2O_3 (7.90A).

Mahla and Nielsen[23] have investigated 18-8 stainless steel oxidized in a furnace at 675°C (1247°F) for 10 min. Their results indicate that Cr_2O_3 is the only oxide which forms. In addition the oxidation of 27 pct chromium-iron, which corresponds rather closely in composition to stainless steel 446, shows primarily the presence of Fe_3O_4 although some alpha Fe_2O_3 is present.

Miyake[24] has reported that $FeO.Cr_2O_3$ and alpha Fe_2O_3 form on the surfaces of stainless steels when they are heated. Iitaka and Miyake[25] stated that they obtained an electron diffraction pattern of $NiO.Cr_2O_3$ from the heated surface of an 80 pct nickel-chromium alloy. They postulate that the marked nonoxidizing property of this alloy may be explained by the formation of this oxide film.

Dr. Hickman author of this article died July 26, 1948—Ed.

Scheil and Kiwit[26], in a study of the scaling of iron-chromium-nickel alloys, report that those alloys which scale the least (less than 0.001 g per sq cm in 7.5 hr at 1000°C) are characterized by the presence of Cr_2O_3 alone. Alloys which lose more than 0.01 g under the same conditions form scales that are characterized by the presence of iron oxides.

In the first part of this article, THE IRON AGE, Aug. 12, p. 90, the author discussed the principles associated with the study of surface structures and outlined the experimental procedure followed.—Ed.

Quarrell[27] reports that an oxide structure of the spinel type is important in affording protection to alloys. In a study of a 13 Cr-13 Ni stainless steel he has found that a spinel of the type $XO.Y_2O_3$ forms where the X position is shared by two or more metals and the X and Y positions are interchangeable.

Jackson and Quarrell[6] have found evidence for the Fe_3O_4-FeO transition at 450°C (842°F) on mild steel.

Mahla and Nielsen[23] have reported that a mixture of NiO and Fe_3O_4 is obtained when Inconel (79 Ni, 14 Cr, 6 Fe) is oxidized in a furnace at 675°C for 10 min. No Cr_2O_3 was detected.

With the exception of the work of Jackson and Quarrel [6, 27], all of the above investigations were made by taking the electron diffraction photographs at room temperature after oxidation had taken place in an auxiliary apparatus.

Table III lists the oxides observed on the alloys when oxidation occurs at 1 mm pressure for 60 min at the several temperatures.

An inspection of table III shows that most of the alloys which are suitable for use at elevated

Temperatures

temperatures form Cr_2O_3, a spinel type oxide or a mixture of these in the high temperature range of oxidation. There does not appear to be any correlation between the structure of the alloy, that is whether it is a single or two phase alloy, face-centered or body-centered cubic, and the oxides which are predominant on the surface in the temperature range under study.

The results on Alchrome 6 are not in agreement with those reported by Kornilov and Sidorishin[22] since oxides of the spinel type are not observed over the entire temperature range. Although the lattice constant of the spinel oxide at 900°C (1652°F), 8.40A, is in agreement with that of Fe_3O_4, it is probable that this oxide contains iron, chromium and aluminum. It is evident that the oxide is not gamma Al_2O_3 whose lattice constant is 7.90A.

In the technique employed in the study described in this article, a sample of the alloy under study is placed inside an electron diffraction camera with its surface at a slight angle to the electron beam. When the high-power stream of electrons strikes the metal surface, the electrons ricochet off and strike the photo film at the bottom of the camera. The resulting pattern traced by the electron beam appears as a series of concentric half-circles. The distance between these rings determines the distance between the atoms in the metallic film being studied. This tells the nature of the surface film.

TABLE III

Oxide Films on the Commercial Alloys

	Temperature °C							
Alloy	300	400	500	600	700	800	900	Ref. No.
Alchrome 6	Spinel	α-Fe_2O_3	α-Fe_2O_3	Cr_2O_3 Spinel	Cr_2O_3	Cr_2O_3 Spinel	Spinel	29
Worthite	Spinel	Spinel	Spinel	Cr_2O_3 Spinel	Cr_2O_3 Spinel	Cr_2O_3 Spinel	Spinel	29
S.S. 301	Spinel	Spinel	Spinel	Cr_2O_3 Spinel	Cr_2O_3 Spinel	Cr_2O_3	Spinel	29
S.S. 446	Cr_2O_3	Cr_2O_3	Cr_2O_3	Cr_2O_3	Cr_2O_3 Spinel	Spinel	Spinel	29
S-588	Spinel	Spinel	Cr_2O_3 Spinel	Cr_2O_3	Cr_2O_3	Spinel	Spinel	29
Nichrome V	NiO	NiO	Cr_2O_3	Cr_2O_3	Cr_2O_3	Cr_2O_3	Cr_2O_3	28
Nichrome	Fe_3O_4	Fe_3O_4	Fe_3O_4	Cr_2O_3	Cr_2O_3	Cr_2O_3	Cr_2O_3	28
Inconel	Spinel	Spinel	Spinel	Spinel	Spinel	....	....	1
Stellite 21	CoO	CoO	Cr_2O_3 Spinel	Cr_2O_3	Cr_2O_3 Spinel	....	....	1
Refractaloy	CoO	CoO	Spinel	Spinel	Cr_2O_3 Spinel	....	....	1
K-42-B	....	Spinel	Spinel	Spinel	Spinel	....	....	1
Hipernik	Fe_3O_4	Fe_3O_4	Fe_3O_4	Fe_3O_4	Fe_3O_4	....	....	1
Kovar	Spinel	Spinel	Spinel	Spinel	Spinel	....	....	1
Mild Steel	Fe_3O_4 α-Fe_2O_3	Fe_3O_4	Fe_3O_4 α-Fe_2O_3	Fe_3O_4 α-Fe_2O_3	α-Fe_2O_3	....	....	1
Z-Nickel	NiO	NiO	NiO	NiO γ-Al_2O_3	NiO γ-Al_2O_3	NiO	NiO	20
Hastelloy-A	Spinel	Spinel	Spinel	Spinel	Spinel	Spinel	Spinel	30
Hastelloy-B	NiO	NiO	NiO	MoO_2 MoO_3	Spinel	NiO	Spinel	30
Hastelloy-C	Spinel	Spinel	Spinel	Cr_2O_3	Cr_2O_3	Spinel	Spinel	30
Hastelloy-D	Cu_2O	Cu_2O	Cu_2O	Cu_2O	NiO	NiO	NiO	30
Alloy-D (Jelliff)	Spinel	Spinel	Spinel	Cr_2O_3	Cr_2O_3	Cr_2O_3	Cr_2O_3	20

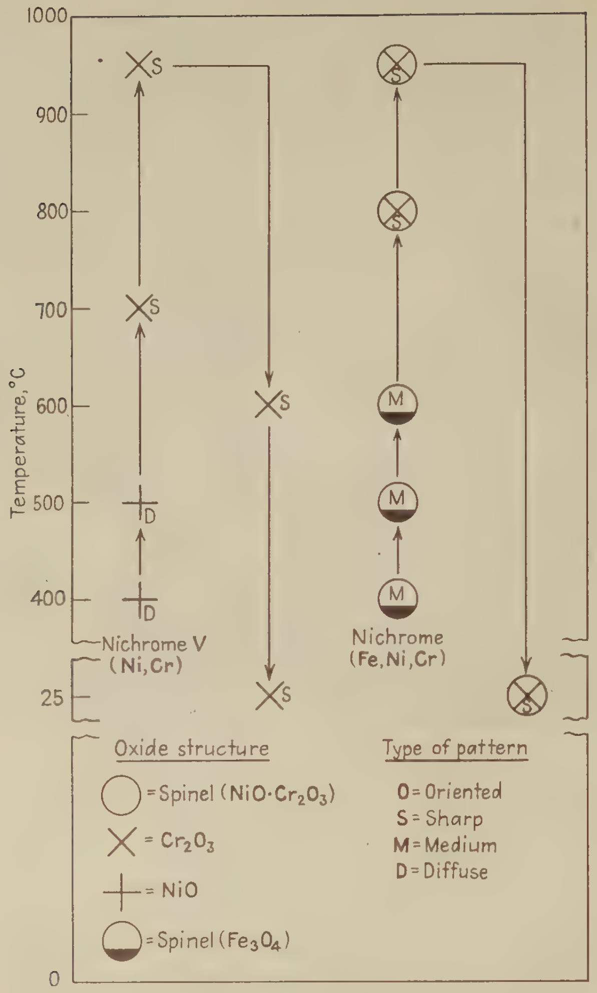
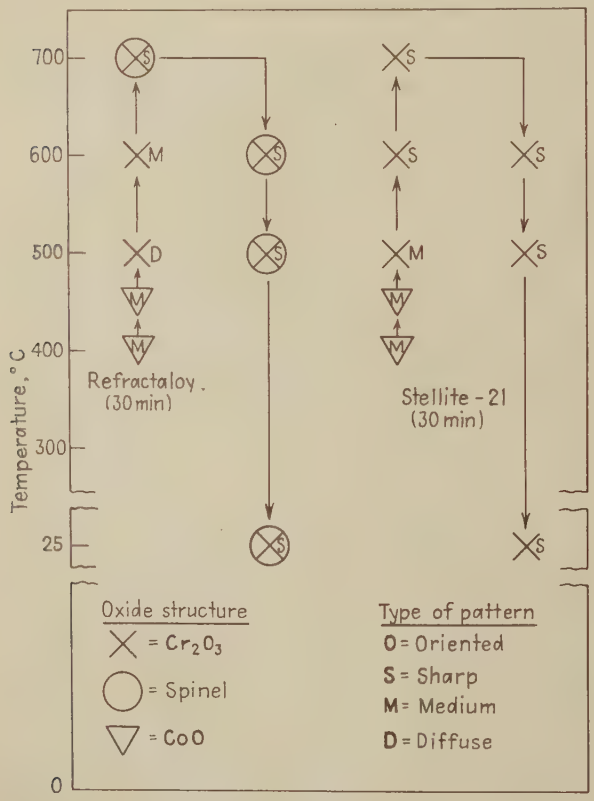

1000
900
800
700
600
500
400
25
0
Temperature, °C
S
D
M
Nichrome V (Ni,Cr)
Nichrome (Fe,Ni,Cr)
Oxide structure
= Spinel (NiO·Cr2O3)
= Cr2O3
= NiO
= Spinel (Fe3O4)
Type of pattern
O = Oriented
S = Sharp
M = Medium
D = Diffuse

FIG. 1 - Heating and cooling oxide films on Nichromes.

FIG. 2 - Heating and cooling oxide films on Refractaloy and Stellite-21.


700
600
500
400
300
25
0
Temperature, °C
S
M
D
Refractaloy (30 min)
Stellite - 21 (30 min)
Oxide structure
= Cr2O3
= Spinel
= CoO
Type of pattern
O = Oriented
S = Sharp
M = Medium
D = Diffuse

The results on stainless steel 301 are in fair agreement with those reported by Mahla and Nielsen.[23] Stainless steel 446 shows the presence of Cr_2O_3 and a spinel oxide at 700°C (1292°F) while the above investigators report Fe_3O_4 and a trace of alpha Fe_2O_3.

The presence of Cr_2O_3 on the surface of Nichrome V is not in agreement with the results of Iitaka and Miyake[25] who reported only the presence of $NiO.Cr_2O_3$. Further work by the author on various Nichromes[28] shows the presence of $NiO.Cr_2O_3$ when the percentage of silicon is low and zirconium, calcium and aluminum are absent.

In agreement with the work of Scheil and Kiwit,[26] the author's study of the Nichromes[28] shows that those alloys, which form mainly Cr_2O_3 on the surface, have the longest lifetimes.

It is not possible from the results obtained on the commercial alloys to state that oxides of the spinel type are most important in affording protection.

Although Jackson and Quarrell[6] report that the Fe_3O_4-FeO transition occurs at 450°C (842°F) on mild steel, the author does not observe FeO on this alloy up to 700°C (1292°F).

The appearance of a spinel oxide, probably Fe_3O_4, on Inconel differs from the results of Mahla and Nielson[23] who report that NiO also occurs. It is possible that the different methods of oxidation may account for this disagreement.

Many of the differences between the present results and those of other workers may be due to the fact that this study involves photographing the surfaces at elevated temperatures while other workers oxidize specimens in auxiliary apparatus and allow them to cool in the oxidizing atmosphere.

The oxide which occurs on Hastelloy A is of the spinel type, probably Fe_3O_4. Hastelloy B, which contains more molybdenum and less iron than Hastelloy A, forms NiO at low temperatures and at 800°C (1472°F). A spinel oxide, probably Fe_3O_4, forms at 700°C and another spinel oxide, which may contain nickel and iron, forms at 900°C.

Fe_3O_4 forms on Hastelloy C below 600°C (1112°F) while Cr_2O_3 forms at 600° and 700°C. A spinel oxide, whose lattice parameter agrees with $NiO.Cr_2$ Cr_3, forms at 800° and 900°C.

Cu_2O is obtained on Hastelloy D up to 600°C and NiO forms above this temperature. No oxides of silicon are observed.

The oxidation of Hipernik indicates that nickel has less tendency than iron to reach the surface since NiO is not observed. It is possible, of course, that the spinel oxide may contain nickel.

Heating and Cooling Oxide Films on the Alloys

Nichromes. Fig. 1 shows the results that are obtained when specimens of Nichrome V and Nichrome (analyses given in table I) are oxidized for 30 min at 400°C (752°F), then heated and cooled in the vacuum of the camera. In both cases the composition of the outer surface of the oxide layer changes as the specimens are heated but no changes occur when cooling takes place.

In the case of Nichrome V (Ni, Cr), the following solid phase reaction occurs:

$$2Cr(s) + 3NiO(s) \rightleftarrows Cr_2O_3(s) + 3Ni(s) \qquad (5)$$

Chromium ions diffuse out from the metal and cause the above reaction to occur at some temperature between 500° (932°F) and 700°C (1292°F). The temperature of this transformation is higher in the heating experiment than that shown in table III where only Cr_2O_3 is observed at 500°C.

The reactions with Nichrome (Fe, Cr, Ni) appear to be more complex since Fe_3O_4 is observed at low temperatures while a mixture of Cr_2O_3 and $NiO.Cr_2O_3$ appears as the temperature is elevated. Initially NiO is probably present under the Fe_3O_4 layer. The following solid phase reactions are probably occurring:

$$8Cr(s) + 3Fe_3O_4(s) \rightleftarrows 4Cr_2O_3(s) + 9Fe(s) \qquad (6)$$
$$NiO(s) + Cr_2O_3(s) \rightleftarrows NiO.Cr_2O_3(s) \qquad (7)$$

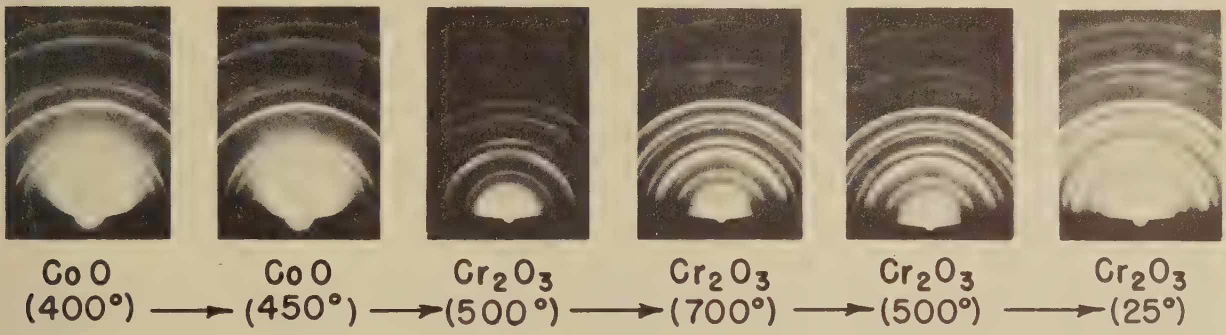


FIG. 3 - Heating and cooling oxide films on Stellite-21 in vacuo (temperatures °C).

The results of the heating and cooling experiment (fig. 1) are not in complete agreement with those given in table III which shows the presence of only Cr_2O_3 above 600°C. However, an extension of the data of table III to 950°C (1742°F) (not given here) shows the presence of $NiO.Cr_2O_3$. It is probable that the differences in film thickness account for the occurrence of $NiO.Cr_2O_3$ at some temperature between 600° and 800°C in the heating cycle.

It is evident from these results that solid phase reactions between metals and oxides and between two or more different oxides are occurring when these alloys undergo a temperature cycling process in use. It is probable that the increased lifetime of the nickel-chromium alloy may be due to the fact that Cr_2O_3 is very stable and the solid phase reactions which are occurring on the surface of the alloy are much less complex than those taking place on the iron-nickel-chromium alloy.

Refractaloy and Stellite 21. Fig. 2 shows the results that are obtained when specimens of these alloys are oxidized for 30 min at 400°C, then heated and cooled in the vacuum of the camera.

On Refractaloy the following solid phase reactions probably occur upon heating:

$$2Cr(s) + 3CoO(s) \rightleftarrows Cr_2O_3(s) + 3Co(s) \qquad (8)$$
$$FeO(s) + Cr_2O_3(s) \rightleftarrows FeO.Cr_2O_3(s) \text{ (spinel)} \qquad (9)$$

It is also possible that the spinel type oxide may contain cobalt.

In the case of Stellite 21 the percentage of iron is so low that there is little probability that oxides of iron will occur on the surface. In this case reaction (8) takes place and Cr_2O_3 is the only oxide observed.

The transformations on both alloys occur at some temperature between 450° and 500°C. Fig. 3 shows the patterns of the oxides on Stellite 21 when heating and cooling occurs.

Hastelloy D and Alloy D (Jelliff). Fig. 4 shows the results obtained when oxides formed at 400°C on these alloys are heated and cooled in a vacuum.

Even though Hastelloy D contains only 3 pct Cu, Cu_2O forms when this alloy is oxidized at 400°C. Upon heating to 600°C, a solid phase reaction occurs to form NiO according to:

$$Ni(s) + Cu_2O(s) \rightleftarrows NiO(s) + 2Cu(s) \qquad (10)$$

It is significant that no oxides of aluminum or silicon are observed. The absence of silicon oxide is in agreement with the results obtained on the silicon-iron alloys. It is possible, of course, that both aluminum and silicon oxide form underneath the copper and nickel oxides. Table III shows that nickel oxide occurs at 700°C and above when oxidation occurs at constant temperature. Fig. 4 shows that the transition occurs between 400° and 600°C when the oxide is heated.

Two transformations occur on the surface of Alloy D (Jelliff) when it is heated in vacuo. Since this alloy has a composition very similar to that of Nichrome it is probable that the same solid phase reactions are occurring on these two alloys.

This study of the oxide structures occurring on the surfaces of some of the commercial alloys shows that:

(1) Most of the alloys form Cr_2O_3, a cubic oxide of the spinel type or a mixture of these at high temperature.

(2) In general, oxides of iron are observed at low temperatures while oxides containing chromium appear as the temperature is elevated.

(3) Heating and cooling experiments show that solid phase reactions occur during temperature cycling.

(4) There does not appear to be any correla-

tion between the structure of the alloy substrate and the oxides which may form on its surface. Both austenitic and ferritic alloys form Cr_2O_3 and spinel type oxides.

(5) On those alloys which contain nickel and chromium (Nichromes) and those which contain cobalt and chromium (Refractaloy and Stellite 21) oxides of nickel and cobalt are observed at low temperatures while chromium oxide appears as the temperature is elevated.

General Conclusions

This study of the oxides that form on the surface of metals and alloys at various temperatures shows that many of the gas-metal reactions which occur are complicated in character. In general the results show that it is not possible to predict which oxides will form on the surface of an alloy by considering the thermodynamic stabilities of the oxides. Neither is it possible to foretell with certainty by considering the relative sizes of the metallic ions. For the most part the factors which seem to be most important in determining the oxide formed are the relative rates of formation and diffusion of the metallic ions. Unfortunately all of the factors that determine the values of these rates are not known. It is evident from this study that ionic sizes and ionization potentials are not always the determining factors. A great deal of experimental work is required to determine the rates of diffusion of metallic ions in alloy and oxide systems. The use of radioactive metals in investigations of this type may be especially beneficial in the future.

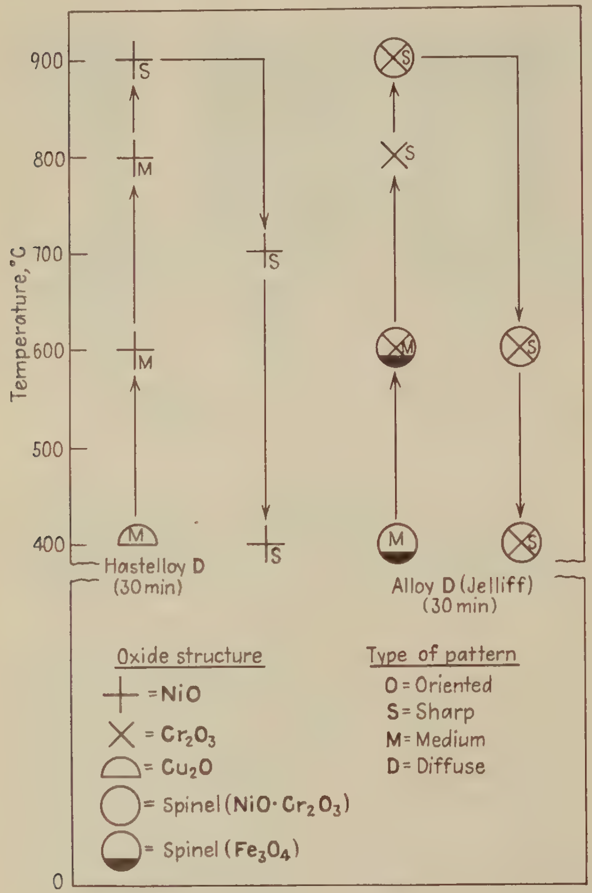


FIG. 4 - Heating and cooling oxide films on Hastelloy D and Alloy D (Jelliff).

The results of this study also show that the rates of formation and diffusion of the metallic ions may vary in different ways with temperature as evidenced by the study of some of the binary alloys. Here the oxides of one metal occur at low temperatures while oxides of the other metal form as the temperature is elevated.

Other instruments are required to supply more complete information concerning the chemical composition of thin oxide films. In some cases it is possible to remove the films by chemical or electrochemical means and perform chemical or spectrographic analyses on the removed films. There is no assurance, however, that chemical changes have not occurred during the removal process. An analytical method, which may be used while the film is present on the metallic substitute, is required.

Unfortunately this investigation has not yielded any information concerning the intergranular and intragranular attack of oxygen on metals and alloys. It is doubtful whether reflection electron diffraction techniques can be used to identify the structures of the oxides formed at grain boundaries or within certain grains of the metallic lattice.

More work should be done on the systems already studied. At the present time several projects have been outlined. Among these are investigations concerned with the orientation relationships of oxide and metal substrate. The oxidation of single crystals of metals and alloys where orientations can easily be determined would be very useful. Attempts are being made to devise experimental procedures involving reflection electron diffraction that will yield quantitative measurements of the rates of diffusion of metallic ions through oxide lattices.

It may be possible to obtain quantitative results by plating known thicknesses of one metal on another followed by oxidation of the plated metal and heating at constant temperature with electron diffraction photographs taken as a function of time of heating. An automatic recording device for electron diffraction patterns would be especially useful in investigations of this type. In addition, reactions of other gases, such as nitrogen, carbon dioxide and ammonia, with metals and alloys should be studied.

The fundamental information obtained by the reflection electron diffraction technique may aid in the fabrication of alloys for high temperature service in gas and steam turbines, jet propulsion and nuclear power piles.

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New Production Ideas . . .

A wet abrasive cutting machine, wire nail machines, arc welders, acetylene generators, heat treating furnaces, pumps, and small tools such as expanding collets, diamond penetrators, and a blind hole rotary broach are described in this issue. Materials handling equipment shown includes telescopic and manual lift trucks, a power wheelbarrow, and lifting magnets.

Abrasive Cutting Machine

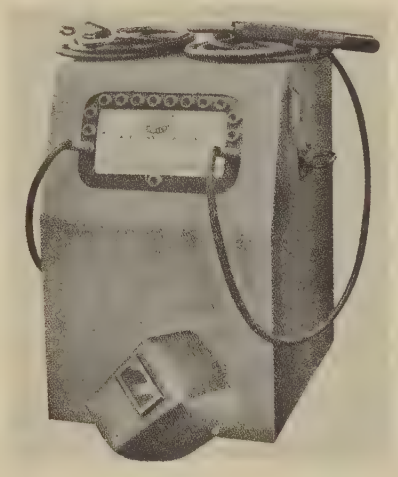
A SEMI-AUTOMATIC wet abrasive cutting machine consisting of an oscillating swing frame, a work feeding and holding mechanism, a coolant system, and a hydraulic work clamping and wheel feed unit has been announced by *Campbell Machine, Div., American Chain & Cable Co., Inc.*, Bridgeport, Conn. The abrasive wheel automatically feeds through the work and upon completion of cut, automatically returns to starting position. The hand-wheel operated feed carriage acts as a length gage bar for cutoff pieces and serves as an ejector for the cutoff parts. A hydraulic gripper in the feed carriage is timed with clamps at the wheel so that the work bar is firmly held by one or the other at all times. Model 460 will cut materials 6 in. diam solid stock or any shape that can be contained in a 6-in. circle.

Wire Nail Machine

IMPROVEMENTS in the wire nail machine manufactured by *Eastern Nail Co.*, 50 Aleppo St., Providence 9, include special alloy steel in the cams and other bearing surfaces for longer wear. Machines are available in two sizes: No. 1 for 14 to 22 gage wire, ¼ to 1¾ in. length nails; No. 2 for 10 to 16 gage wire, and nail lengths of ¾ to 2½ in. Power required for No. 1 machine is 1 hp for 375 to 450 rpm and for No. 2, 2 hp, 175 to 325 rpm. Machines can be furnished for belt drive, with attachment for but without motor, and with motor including V belt, starter and wiring.

AC Arc Welders

INCREASED welding speed, high weld quality, and low operating cost are advantages of the ac arc welder announced by *Burdett Oxygen Co.*, 3300 Lakeside Ave., Cleveland 14. By preventing magnetic blow, the welders produce uniform weld joints in corners and tight spots. Each heat stage is calibrated to give the amperage indicated on the easy-to-read panel and only one contact is necessary in selecting any desired heat. The welder is available with power factor correction which reduces the current drawn from the power lines and improves the power factor.



High Frequency Heating Unit

TEMPERATURE of 1-2/3 lb of average general purpose plastic material in plastic molding can be raised from 80° to 250°F in 1 min, it is reported, with the new 2R Thermex Red Head high frequency heating unit designed by *Girdler Corp.*, Louisville, Ky. Multiposition switches give a choice of manual or automatic heating cycle control, either at the unit or the press. Dual timers govern the heating cycles for preforms with two different characteristics, and in any selected sequence. Fumes and vapor from heated preforms are exhausted behind the unit. An illuminated heating compartment permits observation of material reaction at all times. Spacing between the electrodes is adjustable from ¼ to 5 in. and the drawer accepts preforms up to 4¾ in. in thickness.

Air Circulating Furnace

OPERATING with a maximum temperature of 1200°F, an air circulating furnace has been designed by *Falls Electric Furnace Corp.*, 432 N. Franklin St., Syracuse 1, for annealing and heat treating Duralumin stock before and during fabrication. The load may be various extruded, rolled, drawn shapes and sheets, in all stages of work, maximum load capacity being 4000 lb. The load can be carried on cars on a monorail system or on floor trucks, which are pushed up a ramp into the furnace. Uniform loading is unnecessary since the control mechanism of the furnace cares for all normal inequalities of loading. The active load space measures 17x5½x7½ ft. Maximum temperature differential throughout this furnace is said to be ±5°. The input power is 80 kw and is controlled in four circuits by four independent indicating controllers, the temperature of each circuit being shown by a four point recording instrument. Four air circulating fans are driven by one motor. The motor circuit is interlocked so that the motor must be running in order to have power applied to the heating elements. The fans can be kept operating after the heating elements are turned off to produce uniformity throughout the load during a prescribed cooling cycle.

Welder Controller

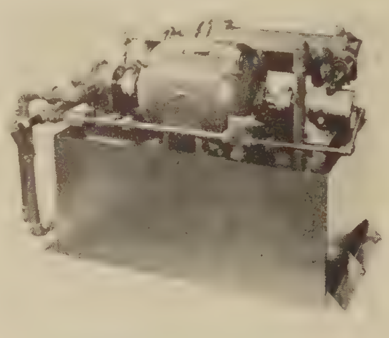
ELECTRICAL control for a small foot or motor operated resistance welding machine is provided by a combination controller developed by *Square D Co.*, 4041 N. Richards St., Milwaukee 12. The single enclosure contains a pneumatic weld timer, a 100 amp, high speed magnetic welder contactor, and a control transformer. Initiating switch and control circuits operate at 110 v isolated from the power supply. The timer is mounted on a Safront swingout panel with the adjusting dial on the front and all energized parts in the rear. Controllers permit either common or separate control supply connections. A dual primary control transformer may be connected for 110, 220 or 440 v 60 cycles, or for 380 v 50 cycles.

Acetylene Generator

CONSTANT acetylene supply is available with the portable acetylene generator announced by *Burdett Oxygen Co.*, 3300 Lakeside Ave., Cleveland 14. The unit is safe and easy to operate. It is designed on the principle of spring pressure opposed to gas pressure, and is said to provide an even, steady flow of acetylene at 13 lb set pressure. Acetylene produced in this unit is from two to three times less expensive than cylinder acetylene, it is reported. Four sizes of generators are available, producing 30, 60, 125, and 250 cu ft of acetylene per 6, 12, 25, and 50-lb carbide charge, respectively.

Pumping Units

DUAL pumping units in various sizes and combinations have been announced by *Universal Hydraulic Machinery Co.*, 285 Hudson St., New York 13. They range from 12 to 40 gpm at 250 psi and from 1¼ to 5 gpm up to 5000 psi. Pumps have double-end motors ranging from 3 to 15 hp with oil cooler, and are mounted on reservoir with relief and unloading valves.



Drill Grinder

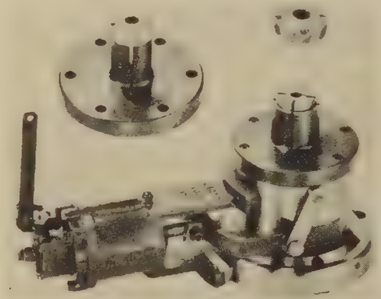
THE average drill can be sharpened in 30 sec with the drill grinder announced by *EZ Mfg. Co.*, 4408 San Fernando Rd., Glendale 4, Calif. The grinder has a protractor fixture and a spacer that is adustable to various length drills. The motor is mounted on a lightweight sturdy metal base, for ease of installation and handling.

Blind Hole Rotary Broach

FINISHES to the bottom of drilled holes are now possible with a blind hole rotary broach developed by *Shearcut Tool Co.*, Reseda, Calif. The helical cutting flutes are right handed, causing the chips being removed to be fed out of the blind hole and making it possible to feed the rotary broach to the bottom of the blind hole. These broaches are sharpened on the front end and also on the helical cutting flutes. The front end cutting edge removes most of the metal, leaving from 0.006 to 0.010 in. to be removed by the short sharpened taper section on the front cutting edge of the helical land. The lands are ground with a back taper of 0.0003 in. per in. to prevent drag and shearing of the work due to misalignment of the spindle and holder. Stock sizes start at 3/16 in. and are increased by 1/32 to 1 in. From 1 to 1½-in. stock sizes are by 1/16 in. increments.

Expanding Collet

AN internal expanding collet for use on standard collet attachments is a flanged device that has a protruding section extending beyond the flange and is split in four ways. A cone-shaped wedge pulling action is obtained by the collet chuck mechanism. The internal collet is fastened with screws and is held concentric by a round seat or pocket ground concentric with the locating surface of the expanding portion. This collet which is made by *Zagar Tool, Inc.*, 23880 Lakeland Blvd., Cleveland 17, is said not to move longitudinally so that overall dimensions on parts to be machined can be easily held.



Diamond Penetrators

TWO improved diamond penetrators for Rockwell testing have been announced by *Clark Instrument, Inc.*, 10200 Ford Rd., Dearborn, Mich. The C diamond penetrator fits all makes of hardness testers for standard Rockwell testing and the S model fits machines for superficial Rockwell testing. Diamond points are specially selected for proper stratification and freedom from internal stresses.

and the holders are designed and finished to correct angles and radii. Diamond penetrators are furnished as a standard accessory on all Clark hardness testers.

Synchronous Differential

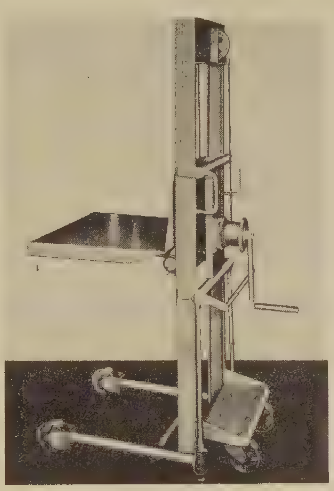
USED in synchronizing of engines, a synchronous differential, announced by *Kollsman Instrument Div., Square D Co.*, 80-08 45th Ave., Elmhurst, N. Y., serves as an intermediary regulating device of engine control equipment. A single frame houses the entire unit, which weighs 28 oz, and which is 2-45/64 in. long x 2-$\frac{3}{8}$ in. diam. The unit consists of two synchronous motors and a mechanical differential, each motor reflecting the operating speed of an engine. These two motors in turn activate a $\frac{1}{4}$-in. threaded output shaft which rotates at a rate equal to one-half the difference of the two motor speeds. When the speeds of the two motors are equalized, the output shaft of the unit becomes stationary. The differentials operate from a three-phase source over a frequency range of 15 to 60 cycles per sec, with an input voltage of 0.007 times the frequency in cycles per min.

Pneumatic Timer

A NEW ac pneumatic timer designed by *Cutler Hammer, Inc.*, 258 N. 12th St., Milwaukee 1, meets timing requirements of conveyer systems, machine tools, automatic processing equipment, etc. The unit measures 2$\frac{3}{4}$ x 4$\frac{7}{8}$ in., making it suitable in machine design where space is at a premium. Its timing adjustment is made from the front of the unit with a screw driver. Eight turns of the screw give the entire timing range from 0.3 sec to 3 min. The timer is available with one or two timing steps.

Manual Lift Truck

FOR lifting, lowering and transporting tools and raw materials, the CH Handy Hoister manufactured by *Lewis-Shepard Products, Inc.*, 279 Walnut St., Watertown 72, Mass., is said to be best utilized in lifting loads to working height and in transferring materials from machines. The hoist is also recommended for raising or lowering loads from highway trucks to sidewalk level. Cranking operation is done through a planetary gear drive winch that permits the platform to be placed and held at any level. One revolution of the handle gives a 3-in. left. Wheels, casters and sheave turn on roller bearings. The base is the open end type to straddle machines or other obstacles. Floor locks at each side of the upright members are operated by a handle. The unit is stocked in a standard size of 500 lb capacity with 24x24-in. lifting platform; 5$\frac{1}{2}$ in. lowered height; 58 in. lifting height; 71 in. overall height and 5 in. diam wheels.



Power Wheelbarrow

A STURDILY built power wheelbarrow, built by *Kwik-Mix*, Port Washington, Wis., is powered through V-belt drive and fully enclosed gears from an air-cooled 3.9 hp gasoline engine, and has a capacity of 10 cu ft or approximately 1000 lb. It is equipped with finger-tip control of speeds from 2 to 4 mph, both forward and reverse. Features include an instantaneous gravity dump body with chain stop that assures a clean dump every time; a steering device turns the machine in its own length. Maximum width of the wheelbarrow is 33 in. It is mounted on two rubber-tired wheels with a single rubber-tired steering wheel.

Telescopic Lift Truck

A NEW 120-in. telescopic Worksaver, announced by *Yale & Towne Mfg. Co.*, 4530 Tacony St., Philadelphia 24, has a capacity of 3000 lb and makes possible maximum use of available headroom in high-stacking operations. The high reach combined with a lowered clearance of 83 in. is accomplished by means of a ram-within-a-ram. When an outer hydraulic piston has fully extended upward, an inner one begins to extend downward, doubling the lift available. The truck travels 2 mph under full load, lifts 8 fpm with 2500-lb load, and tilts a full 18° in 10 sec. Total weight of the truck, including a 19 plate battery, is 3640 lb. Though battery powered in every respect, it is guided by a walking operator. Dimensions are 33 in. wide x 64 in. long.

Thread Cleaner

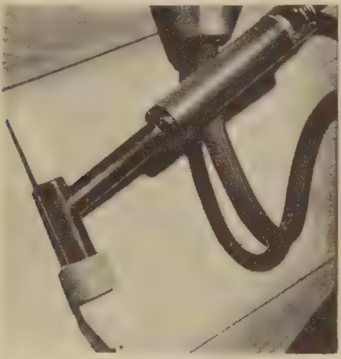
FLATTENED, distorted, or badly rusted right and left-hand threads on bolts or studs up to 2-9/16 in. diam can be cleaned and quickly restored with the thread cleaner announced by *Buckingham Mfg. Co., Inc.*, Binghamton, N. Y. Damaged threads of any size or pitch on any type of bolt can be quickly reconditioned so that nuts can be removed or put on. The cleaner is slipped over the bolt, the cutting jaws tightened into the threads, the nut closed, and the cleaner turned until the threader comes off the bolt. The threader is set and held to size by a single lock nut on the knurled handle. The tool is made in bolt size capacities of 1 and 2-9/16 in. diam.

Plating Without Electricity

NICKEL plating without the use of electric current can be accomplished with Lustralloy, a material available from *Lustralloy Sales Corp.*, 10 E. 52nd St., New York. It is said to leave a bright high quality finish that is tarnish and corrosion proof, and may be applied to any base metal with excellent bond. Thicknesses are uniform on all contours and recesses, it is reported. Through the use of heat treatment, which is at relatively low temperature, and harmless to the Lustralloy finish or most base metals, Lustralloy may be hardened. This treatment also provides inter-diffusion of Lustralloy with the base metal to form an indestructable bond, showing at the same time poorly bonded areas, by the formation of blisters.

Heliweld Holders

NEW manual Heliweld holders manufactured by *Air Reduction*, 60 East 42nd St., New York



17, provide a heavy-duty water-cooled holder suited for production work and for general purpose jobs within the range of inert-gas-shielded arc welding. The exterior of the holder is all-plastic, providing insulation against both the welding current and the high frequency current required for arc-starting and arc-stabilization. The light weight of the plastic makes possible a heavy duty tool weighing only 28 oz. The built-in water-circulating system, which extends almost to the point where the electrode is gripped, prevents overheating during prolonged use. The holder has 300 amp capacity.

Soldering Iron

AN electric soldering iron for use on fast production lines where greater speed is required from an iron with a small tip diameter is announced by *Hexacon Electric Co.*, 144 W. Clay Ave., Roselle Park, N. J. This iron is the plug tip type rated at 200 w, with a ½-in. diam tip which is said to reach a soldering temperature considerably beyond that of conventional irons. Elements and tips are replaceable. The iron works off 110 or 220 v line circuits, ac or dc, any cycle.

Rack Coating Tape

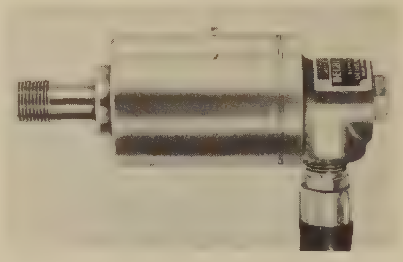
A SYNTHETIC resin in easy-to-use tape form for insulating plating racks has been announced by *Hanson-Van Winkle-Munning Co.*, Matawan, N. J. This orange-colored Wrap-Rax is effective as a stop-off in hard chromium and other plating solutions. It resists abrasion and wear, and chemically resists cleaning, pickling and plating solutions commonly used. It gives uniform coverage, edges and flat surfaces being covered equally. Wrap-Rax prevents disintegration of the plating racks and cuts current and metal losses to a minimum. It is furnished in 250-ft rolls, ¾ in. width.

Lifting Magnets

HANDLING iron and steel in the storage yard, warehouse, stockroom or shop can be facilitated with the mobile mounted lifting magnet announced by *Cutler Hammer, Inc.*, 258 N. 12th St., Milwaukee 1. The magnets can be mounted on any boom with a source of electrical power. Structural features include manganese bottom plate, dynamo steel body, coil impregnated under heavy vacuum, water-tight terminal box and long-wearing chain construction.

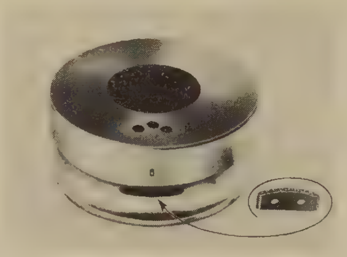
Rotating Union

THE new Deublin Union, a leak proof, 3-in-1 rotating joint, employed in heating or cooling revolving shafts, cylinders, or drums from – 30° to 300°F, will handle steam, air, or liquids. Leakage is prevented by a special Deub-Lock pressure seal and press fit assembly. Stainless steel, brass, and cast bronze materials of these joints that are manufactured by *Deublin Co.*, Northbrook, Ill., resist corrosive action of vapor, gases, or liquids used for heating or cooling. Starting torque is practically eliminated. Lubrication is of the purge type and grease is held where needed by a system of pockets. Double row ball bearing and concentricity of threads in relation to the bearing surfaces are said to assure non-wobbling performance when properly installed. The Union is available in ½, ¾, 1, and 1½ in. sizes.



Insert Roll Die

A NEW style insert roll die for marking copper or brass pipe and tubing is manufactured by *M. E. Cunningham Co.*, 101 E. Carson St., Pittsburgh. Identified as the Kop-R-Tube insert marking roll, it can be used in marking machines or in standard coiling machines used for coiling the copper tubing.



It is grooved to suit the size of tubing to be marked, and has a recess slot for changeable marking die inserts.

High Tensile Nut

A NEW high tensile, double hex nut has been designed by *Elastic Stop Nut Corp.*, 2330 Vauxhall Rd., Union, N. J., to develop 185,000 psi minimum in NAS high strength aircraft bolts where weight and space limitations are major factors. Completely interchangeable with existing internal wrenching nuts, this double hex design is said to permit weight reduction of 66 pct and a height reduction of 50 pct. The nut features a nylon locking collar, cadmium plated forged steel body, and is self-locking in any position on bolt or stud. Type EB is available in sizes ¼ through 1⅛ in. in National fine thread series.

Spring Kits

MANY sizes of individual extension springs in lengths up to 12 in. and up to ½ in. diam with looped or hooked ends can be made with the tools and stock springs contained in a kit announced by *Gardner Wire Co.*, 5045 W. Lake St., Chicago 44. The Senior kit includes a Hook-Kon spring looping tool adjustable to put open hooks, single loops or double loops either across center or to one side on exsion springs up to ½ in. diam and 0.0625 in. diam wire; spring cutter for cutting springs to desired length; and 112 ft of stock springs ranging from 0.012 to 0.0625-in. diam wire and in spring diameters from 3/32 to ½ in.

First quality high speed steels

more malleable
before heat treatment
tougher
afterward
it's their nature—
and it comes from
Controlled
Melting
Formulas

RIGHT . . . right from the start! The fine, sound tool steel our customers depend upon from Vanadium-Alloys is quality-determined *before* each heat by our exclusive Controlled Melting Formulas. With forty-five years of experience in producing First Quality tool steels, we formulate precise blends of materials for each furnace charge according to our special knowledge. This is a *basic* step in achieving the easy-working, tough-hardening character of our steels, so well-known throughout industry.

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STEEL COMPANY
COLONIAL STEEL DIVISION   ANCHOR DRAWN STEEL CO.
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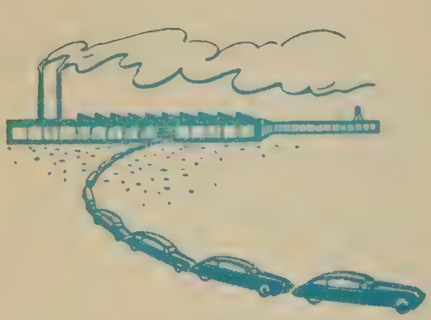
Manufacturers of
FIRST QUALITY
TOOL and DIE STEELS
—exclusively

Assembly Line . . .

WALTER G. PATTON

• Foundry strike poses serious threat to auto output . . . Steel producers reported cutting output of single alloy steels . . . High compression engines making definite progress.



DETROIT—Weekly auto production is continuing over the 100,000 mark despite current strikes and steel shortage headlines. Lincoln, Willys-Overland and Hudson, among the larger independent producers, have already been idled or nearly so by the Campbell, Wyant & Cannon dispute. In addition, truck producers like Federal and Diamond-T have been hard hit.

This week, Chrysler, Studebaker and Oldsmobile were holding to earlier production levels but the fact that each of these firms is dependent on the big Muskegon foundry for its camshafts has cast a shadow over their future production. There were unconfirmed reports this week that Chrysler has been forced to call in replacement camshafts from its dealers in the field in order to maintain present production schedules.

Meanwhile, Federal conciliators have been called in to help unsnarl the labor dispute that has shut down CWC for more than a month. The main issue involved in the strike, it is reported, is the union shop and no break in the present stalemate was indicated as this issue goes to press. Several weeks ago agreement was reached between union and company negotiators, it is reported, but the union membership failed to ratify the agreement at the subsequent election.

It is general practice for auto producers to carry large banks of motor blocks and camshafts to insure against the possibility of broken production schedules. This is one reason why many executives here feel that the "duration" of the Campbell, Wyant and Cannon dispute will exceed the strike by considerable margin. Producers are expecting a lapse of at least 10 days following the settlement of the strike before production can be resumed in some auto plants.

Truck production recently menaced by a strike at Timkin-Detroit Axle Co. which had gone into its fifth week was given a respite as the strike was settled this week.

At the moment, most auto producers would be willing to settle for 400,000 vehicles produced during the month of August. However, attainment of this goal will depend on an early settlement of the Campbell, Wyant & Cannon dispute and freedom from additional steel shortages during the remainder of this month. At the moment, Briggs' Connor plant and Packard are closed for lack of steel.

According to steel representatives here, August promises to be a tight month for all auto producers so far as steel is concerned. The pressure on steel suppliers to make deliveries was never greater, according to several Detroit steel representatives.

The possibility that far-reaching changes in alloy steel specifications may be forced on the auto industry was seen here this week when one car maker was notified that single alloy grades—carbon-moly, chromium, manganese and silicon steels —will not be available in large quantities during the fourth quarter this year.

Reason given for the change is that, due to the presence of substantial quantities of alloying elements other than molybdenum in
the scrap, it is becoming increas
ingly difficult to make the so-calle
single alloy grades. Specifically, th
steels affected are SAE 400
4000 series carries an alloy extr
of $0.75 compared with an extr
of $1.00 for SAE 8600 steels an
$2.00 for SAE 4300. Steel pr
ducers are leaning very strongly i
the direction of producing tripl
alloy steels only, according to sev
eral automotive sources.

* * *

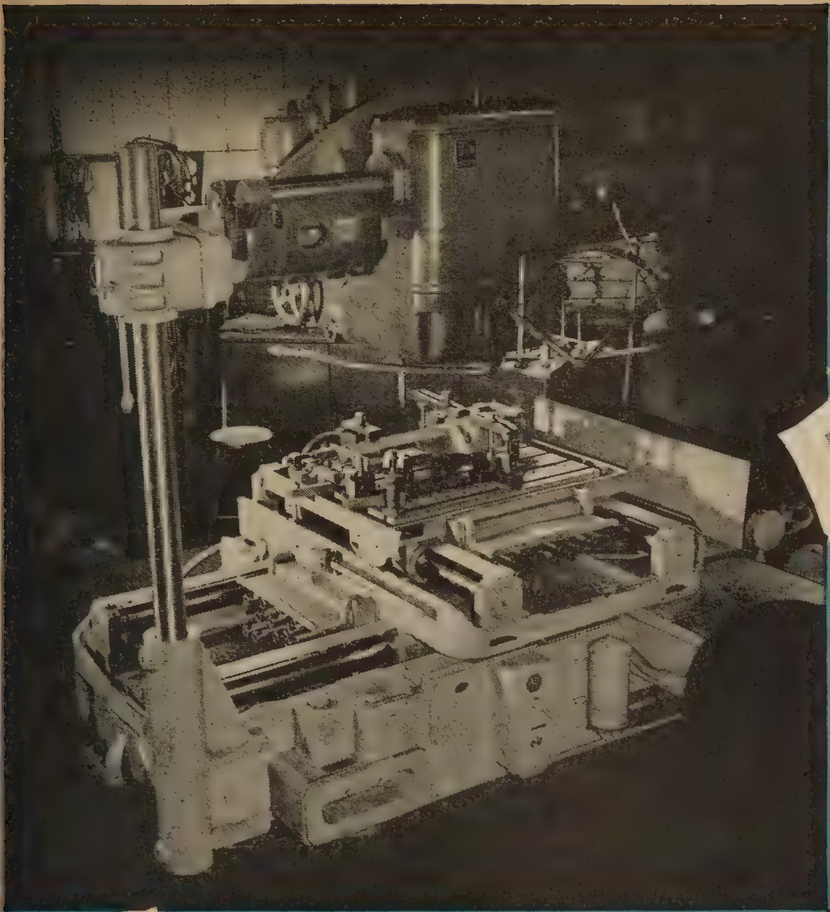
THE general outlines of the plan
auto manufacturers **have fo**
switching over to higher compres
sion engines become a little cleare
this week. It was reported that th
new Olds V-8 engine plant at Lan
sing is almost ready to go int
pilot production. This practicall
assures quantity output of the ne
engines for several of the G
models which are to be introduce
very late in 1948 or in early 194

Blocks for the new power plant
will be produced at Central Foun
dry Div. of General Motors, D
fiance, Ohio. Reports were also r
vived this week that a high com
pression V-6 for Chevrolet is bein
seriously considered.

Cadillac has closed its foundr
for 2 weeks. Informed sources b
lieve this plant is about ready
go into production on a new powe
plant of the so-called "Kettering
high compression type.

It is known that Ford is exper
menting constantly with highe
compression engines but plans fo
the introduction of these new powe
units are veiled with uncertaint
Ford has recently invested heavil
in new tooling for engines for i
present model. In addition, it ha
been pointed out that very litt
progress has been made in makin
high octane fuel available at g
station pumps.

It is reported, however, th
large scale experimental work is b
ing conducted by petroleum pr
ducers. Much of this fuel is cu
rently on test in automotive labor
tories. There are also indicatio
that research engineers in tru
plants have a special interest
high compression fuel where th
greater economy of high compre



PRODUCTION NEWS ABOUT BULLARD MAN-AU-TROL SPACERS

1.

HERE'S HOW ONE LOOKS IN ACTION AND WHAT THE USER SAYS

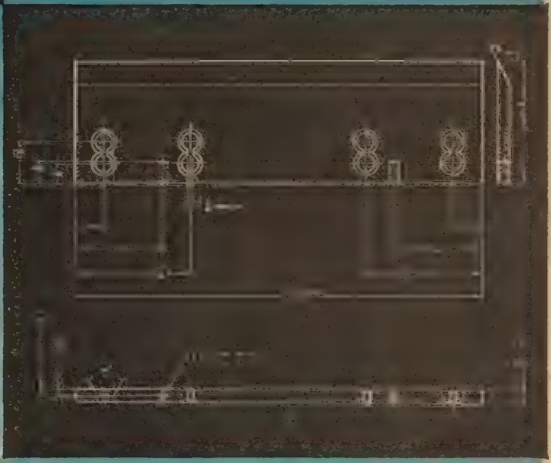
This is a BULLARD 30"x20" Man-Au-Trol Spacer being used by Kearney & Trecker, Milwaukee, Wisconsin with the following reported results: "We find that on parts where we do not have fixtures, the saving is considerable. We find that due to accurate positioning, we get more accurate work. We also find new uses every day; uses which we never thought of when we purchased the equipment".

HERE'S WHAT TWO OTHERS HAVE DONE

2.

AT HEPPENSTALL COMPANY, PITTSBURGH . . . PRODUCTION TIME CUT BETTER THAN 36%

Drilling and countersinking 13/16" diameter holes in this chipper knife used to take 95 minutes per piece for layout and drilling. The same job done with a BULLARD 30"x20" Man-Au-Trol Spacer, including setup time, takes only 60 minutes. According to C. W. Heppenstall, Jr., vice-president of this progressive firm, this new hole-locating method is "a real advancement in the science of metal working".



HOW MUCH CAN YOU SAVE?

Your first step toward learning how much you, too, can save in production time, jig fabrication and worker fatigue is to write for the latest Man-Au-Trol Spacer Bulletin. THE BULLARD COMPANY, Bridgeport 2, Connecticut.

BULLARD MAN-AU-TROL

3.

AT R. HOE & CO., INC., NEW YORK CITY . . . OVER $2500 IN JIG FABRICATION SAVED IN 3 MONTHS

This maker of fine printing presses *not only* saved time on every job handled by a BULLARD Man-Au-Trol Spacer *but also* eliminated 75 hole-locating jigs in three months for a total saving of $2500 to $3000. Officials of R. Hoe & Co., Inc. further report that plans for constructing one of the world's largest presses for the Philadelphia Inquirer will require practically no jigs because of the use of the BULLARD 30"x20" Man-Au-Trol Spacer.

BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

sion engines is especially desirable. Another factor is the existence of fuel distribution systems by certain truck owners. Many sources here feel that the first large scale use of high octane fuels will occur in the truck field.

Meanwhile, Kaiser-Frazer plans to step up the compression ratio of its engines when the newest models are introduced in September. Most sources believe that changes in the design of the cylinder head will permit stepping up the compression ratio of the Kaiser and Frazer cars to 7:5. The present ratio is 7:3. This is believed to have contributed substantially to the fact that many Kaiser and Frazer owners report they are able to get more than 25 miles per gal with their present cars. No changes will be made in the present engine block, it is indicated.

* * *

THE new Kaiser and Frazer cars to be introduced in September will have extensive design changes, it is reported. The revisions constitute much more than a "face lifting".

While no major body changes are reported, a considerable amount of decorative trim will be added, it is reported, including curved strips along the sides and the bottom of the doors to give more rounded appearance. The indentation for the license plate in the rear is to be abandoned, according to informed sources. New trim will be added to produce a decidedly lower appearance in the rear. Many changes will be made in interior appointments. The most comprehensive changes in the powerplant will be the boost in the compression ratio, it is believed.

* * *

B. F. Goodrich is making the first major expansion of production facilities in Akron in nearly 20 years. The new plant will occupy the site of four smaller buildings that will have to be razed. Planned capacity is 150,000 sq ft of floor space.

The greatly expanded demand for a conveyer building is given as one reason for a new plant expansion. More than 2000 tons of structural steel will be required for the new building, according to Goodrich officials.

* * *

THE tremendous job of handling materials and parts flow in a modern auto plant is described in detail in a recent tissue of the Pontiac Warrior. For example, in the new 1948 Pontiac car there are 2800 component parts. Six hundred of these parts are manufactured in Pontiac sheet metal plants. Approximately 100 additional parts are made in the Pontiac foundry. The balance of the parts has to be purchased from 2100 suppliers.

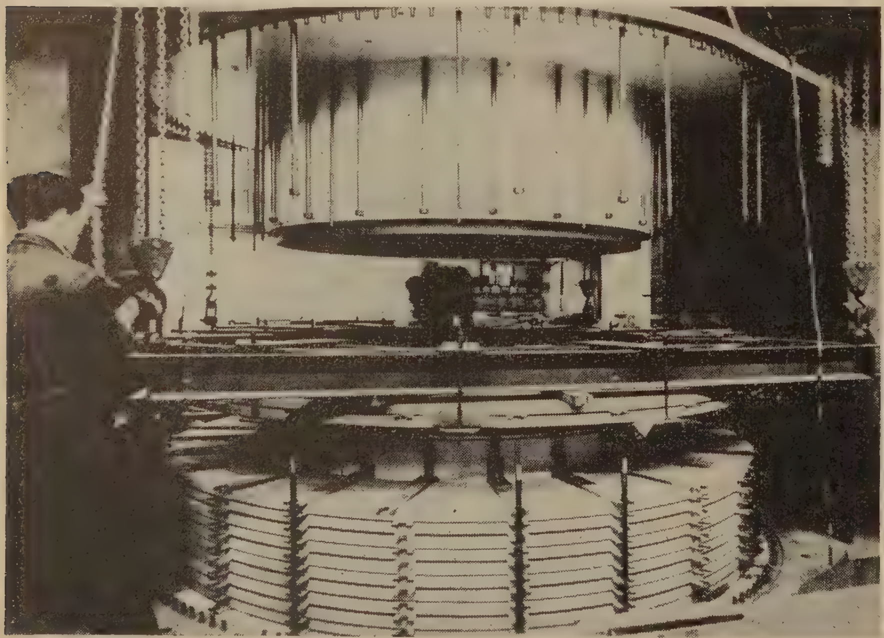
At the present time the Pontiac foundry is making 11,000 tons o castings per month to meet requirements for the car. Aggregat weight of the foundry material handled including sand, pig iron coke, cast scrap and borings, aggregates more than 30,000 tons.

Pontiac's sheet metal plant currently requires more than 8000 ton of steel per month to maintain it operations. Approximately 38 pc of all the steel handled become scrap as the result of blanking trimming and piercing operation The scrap is, of course, used in th foundry.

On an average day, the Pontia materials department receives approximately 70 truckloads and 5 carloads of material. About 50 pc of this material must be rehandle in subsequent shipments to six Pontiac assembly plants scattere throughout the country.

Proper timing and coordinatio of this tremendous flow of materia would be difficult in normal time According to Pontiac official where stringencies occur, the diff culty of the job is multiplied several times. While shortages o parts from supplier plants whic were so characteristic a few year ago are not as widespread today the knowledge that failure to supply a single part will stop an assembly line offers little peace of min to the harried purchasing agent o scheduling engineer in a moder automobile plant.

ATOMIC SNOOPING: The British are building an atomic energy research laboratory at Harwell, Berks, where a team of prominent scientists under the direction of Sir John Cockroft are probing the secrets of the atom. The 110-in. cyclotron magnet shown, containing 700 tons of steel, is being erected for research purposes.



Builds 42 Pct More Motor

Muskegon, Mich.

• • • **During** 9 months ende July 31, 1948, Continental Motor Corp. shipped 186,918 automotiv and industrial engines, a gain c 42 pct over the previous year, according to C. J. Reese, president.

Reese disclosed that automotiv and industrial engines produced b Continental now constitute 60 pc of the company's total sales.

Sales during June and July wer the largest since production wa resumed following the war, the report said.

Including all types of engine produced, Continental shipped 244 098 units compared with 169,69 during the first 9 months of 194'

Continental is currently produ ing a substantial percentage c Kaiser-Frazer passenger car engines at its Muskegon plant. Thi company also supplies powerplant for a number of producers c trucks and buses.

Quintessence of Utility

• Modern designers are proving that beauty often leads to the ultimate in utility. This new trend is finding full expression at Auto-Lite's great Bay Manufacturing Division in Bay City. Here under one roof are the technical skills and production capacity for a new art rendered in plastics including brilliantly colored elastomeric plastics, decorated metals and metal-plastic combinations. The artistic skill of Auto-Lite's Art and Style Division is available on matters of design and development.

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Washington . . .

EUGENE J. HARDY

• Senate Committee urges steel demand study . . . Commerce Dept. approaches problem from new angle . . . Suggests cooperative effort with industry financing.

WASHINGTON—The clamor for an accurate projection of steel demand is becoming acute in the nation's capital. On Capitol Hill, requests for a Commerce Dept. study had previously come from New Deal legislators who were primarily interested in getting material to back up their arguments for a government-sponsored steel expansion program.

Now the Republican side has gotten interested. For example, legislators studying the effects of the adoption of f.o.b. mill pricing by the steel industry realize that no accurate estimate can be made unless there is complete knowledge concerning the destination of steel products, distribution by geographical location, cost of transportation, the relative future growth pattern of steel consumers, technological changes which make for changes in steel demand, etc. In fact, a whole host of material is needed, which it is felt would be developed by a study of steel demand covering the next 5 years or so.

More concretely, Sen. Kenneth Wherry, Rep., Nebraska, whose Small Business Committee has been listening to stories of steel shortages for many months, has come to realize that before the industry or government can take any constructive action an accurate knowledge of future steel demand must be at hand.

Accordingly, the senator has written the Secretary of Commerce urging completion of such a study at the earliest possible date. While there have been many studies of this nature released since the end of the war, the Small Business Committee, after thorough investigation of the whole subject, feels that no true picture of steel demand and capacity has been assembled, and that a study by the Commerce Dept., if projected to cover probable demand for the next 4 or 5 years, would be the most reliable yet. The Committee feels that Louis Bean's studies are just as extreme in their estimates of high demand as the American Iron & Steel Institute is conservative in its estimate (THE IRON AGE, Aug. 5, p. 104).

THE Committee does feel, however, that industry—if it has a projection in which it can place confidence—will go ahead with whatever planning is necessary to meet the steel shortage without government interference.

Commerce Dept.'s explanation to the Committee as to slow progress on the demand study has been the familiar complaint of insufficient funds and personnel, and not without some justification. About a year ago, R. M. Weidenhammer of the department's Iron and Steel Div. began to lay the groundwork for such a study. To date, he has been able to complete only the preliminary work on the automobile industry's needs for steel.

Commerce officials have been trying to get a full-fledged study of steel demand under way for some time. Last fall the then Secretary of Commerce, W. Averell Harriman, approved an outline for such a study to be undertaken by the Iron and Steel Div. The outline approved by Mr. Harriman called for estimates of steel demand by consuming industries rather than statistical projection of past history.

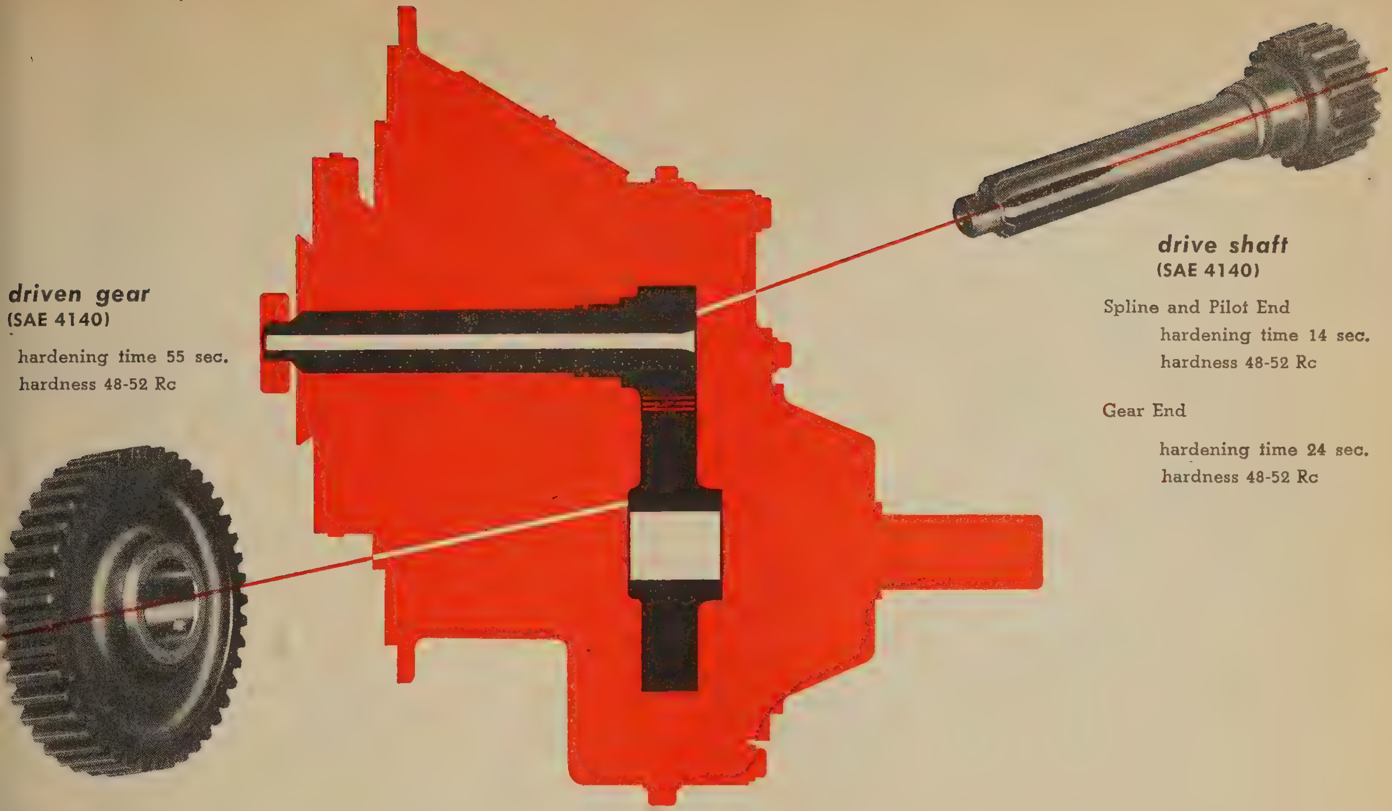
An advisory committee from the steel industry and steel consuming industries was to be set up to work with Commerce. Automobiles, machinery, petroleum, containers, construction and farm implements were among the consuming industries included in the panel of names submitted to Mr. Harriman.

HOWEVER, this effort came to naught as a result of the enactment of Public Law 395, the voluntary allocations law. With large numbers of industrialists being asked to serve on advisory committees to aid the government in working out voluntary agreements, Mr. Harriman felt that it would be asking too much of these men if an advisory committee to work on the demand study was added to their load. Accordingly, the ambitious project fell by the wayside for the time being, and the Iron and Steel Div. continud its preliminary work as best it could.

With the arrival of Elliot Hanson, recently appointed chief of the Iron and Steel Div. in the Office of Domestic Commerce, the project has again been brought to life. It is now being approached from a new angle although the basic thinking is the same as that approved by Mr. Harriman, that is, estimates by consuming industries.

This new approach, according to Mr. Hanson, involves outside financing to be provided by the steel industry and its major consuming industries. Recognizing the difficulty of obtaining needed appropriations from Congress to complete such a study, Mr. Hanson feels that outside financing must be obtained if the study is to be finished in time to be of any real value. His superiors feel that a comprehensive study of steel demand should be completed in less than 2 years.

Along with outside financing, Mr. Hanson is thinking of an industry



driven gear
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hardening time 55 sec.
hardness 48-52 Rc

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hardness 48-52 Rc

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hardening time 24 sec.
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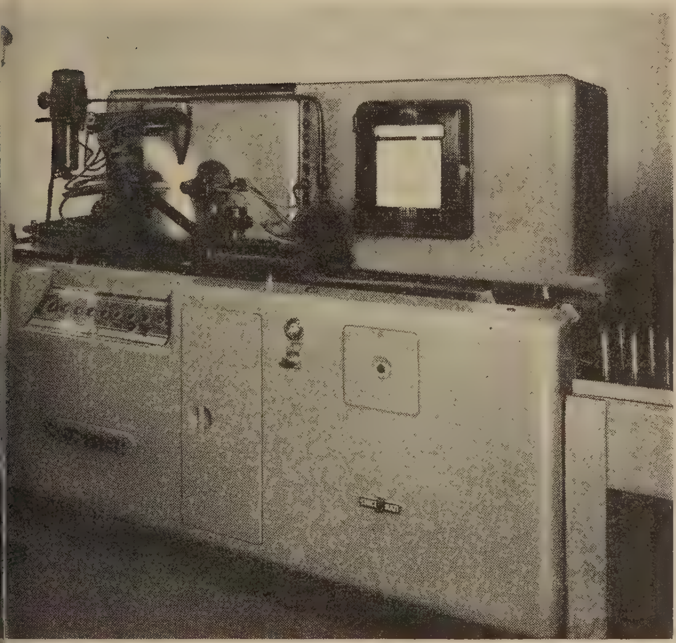

ing

Low capital investment, low operating costs, application to wide range of parts, quick setups for short run economy, and ability to duplicate exact desired results, part after part, run after run – these are the chief reasons that Rockford Clutch Division, Borg Warner Corp. has found the Cincinnati Flamatic Hardening Machine so profitable.

Take the drive shaft and gear shown above, for instance: From scratch, operator easily positions flame heads, puts work holding fixture on spindle, presets desired "release" temperature, sets master switch on "automatic" and is ready to run. Operator loads the machine, presses button. High temperature flames heat surface to within plus or minus 5°F of preset value, at which instant the electronic control stops flames, piece is automatically deposited in oil quench. Distortion: negligible. Subsequent machining: none. And Rockford reports **no failures** of any parts processed on the Flamatic.

If you harden gears up to 12" diameter, shafts up to 20" long, write for Flamatic Catalog (Publication M-1611) and see how much Flamatic surface hardening can save for you.

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committee to work with government—a committee drawn from the steel industry as well as steel consumers, or perhaps, two committees. Such a committee, or committes, would be composed of technical peope, versed in market research, or in plain words a working committee rather than a purely advisory group.

MR. HANSON feels that the value of such an approach lies in the tying together of a group which has government sponsorship along with all government facilities at hand, but still retains the freedom of industry operation. He visualizes a study that will initially cover the next 4 to 5 years, but will also be kept current as economic changes necessitate another look at steel consumption and distribution.

The industry committee approach is also felt to be valuable since both the steel industry and its consumers representing differing views might be reconciled and the finished job could make an honest claim to impartiality and objectivity.

The Senate Small Business Committee approves this new cooperative approach as well as the plan to make estimates by consuming industries.

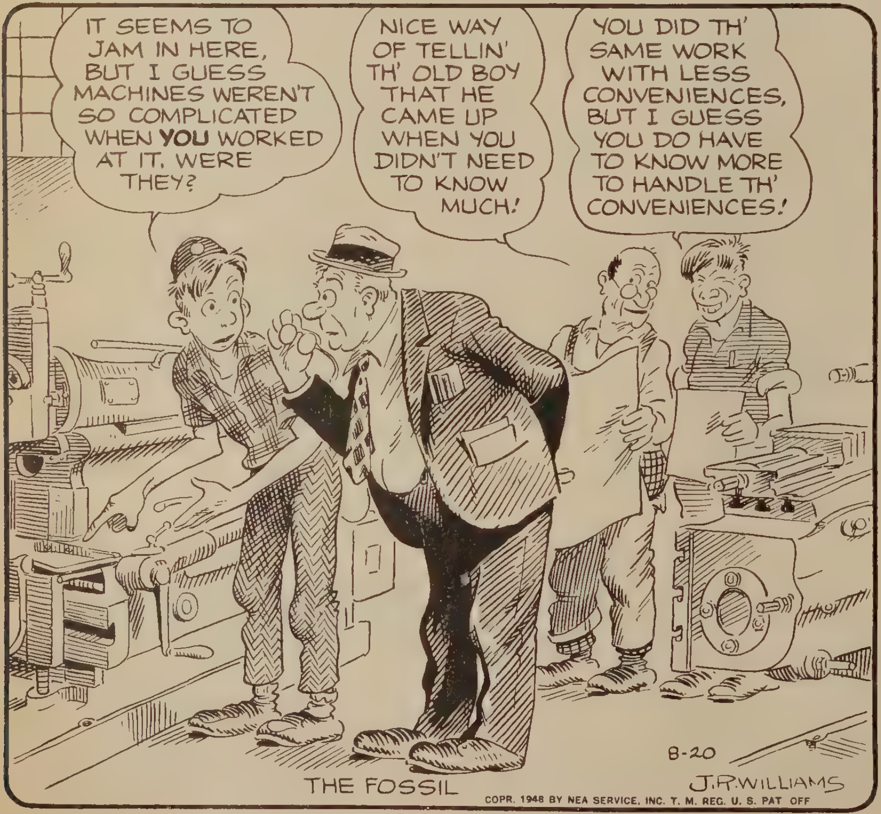
Steel industry participation and financing will be carefully thought out, however, before any concrete moves are made in this direction. Top Commerce officials remember the most recent incident involving industry participation in a Commerce steel project. This involves the comprehensive book on the iron and steel industry, designed to be a basic reference work of factual information on the nation's basic industry. For a period of 2 years the Iron and Steel Div. has worked on this book along with a review committee from the steel industry which originally pledged complete cooperation.

Several months ago, the industry committee decided to drop its original agreement and all bets were off. Commerce officials are at a loss to understand the industry's reluctant dragon attitude, particularly since about half the chapters had already been painstakingly reviewed by committee members.

Described as being in an "indefinite" status, the book has been sidetracked, and the Iron and Steel Div. has decided to devote its time to more urgent projects, i.e., the steel demand study.

THE BULL OF THE WOODS

BY J. R. WILLIAMS


IT SEEMS TO JAM IN HERE, BUT I GUESS MACHINES WEREN'T SO COMPLICATED WHEN **YOU** WORKED AT IT, WERE THEY?
NICE WAY OF TELLIN' TH' OLD BOY THAT HE CAME UP WHEN YOU DIDN'T NEED TO KNOW MUCH!
YOU DID TH' SAME WORK WITH LESS CONVENIENCES, BUT I GUESS YOU DO HAVE TO KNOW MORE TO HANDLE TH' CONVENIENCES!
8-20
THE FOSSIL
J.R.WILLIAMS
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Hanover Steel Corp. Offers Information Through New Office

Washington

• • • **A new type of** industrial information service is being planned for its customers and potential customers by Hanover Steel Corp. The firm has organized a program to offer, through its newly opened Washington office, pertinent information concerning present government regulations, agencies, etc.

This program is designed to clarify to some extent the various confusions and doubts regarding the position of the manufacturer in the rearmament program. The facilities and personnel of the new office are at the disposal of the firm's customers without cost.

The company hopes to disseminate pertinent information concerning current happenings in Washington by letter and will answer any questions that its customers may have regarding the rearmament preparedness program. It will also attempt to handle "specific matters" for these customers in Washington.

Hanover Steel Corp. is a subsidiary of Solar Steel Corp., whose operations are principally conducted in Detroit, Chicago and Cleveland. Hanover services users of flat rolled steel products in the Eastern area. It is just completing its new warehouse facility in Union, N. J.

Pipe Mill Is Modernized

Gary, Indiana

• • • **The rebuilt** and modernized seamless pipe mill of the National Tube Co. here has begun peacetime production, according to Leo J. Mason, vice-president of the company.

During the war the mill turned out tubing for Navy rockets, military aircraft and lend-lease.

The rebuilt mill will include a doughnut-type rotary heating furnace and a new 13-unit reheating furnace. Other new facilities will enable the mill to turn out tubes from 3 to 9 in. O. D. and up to 45 ft in length.

The Gary plant will specialize in alloy, stainless and carbon tubing such as is used in dairy and chemical plants, all kinds of aircraft, ball and roller bearing races, industrial conveyor belts, still tubes and other similar applications.

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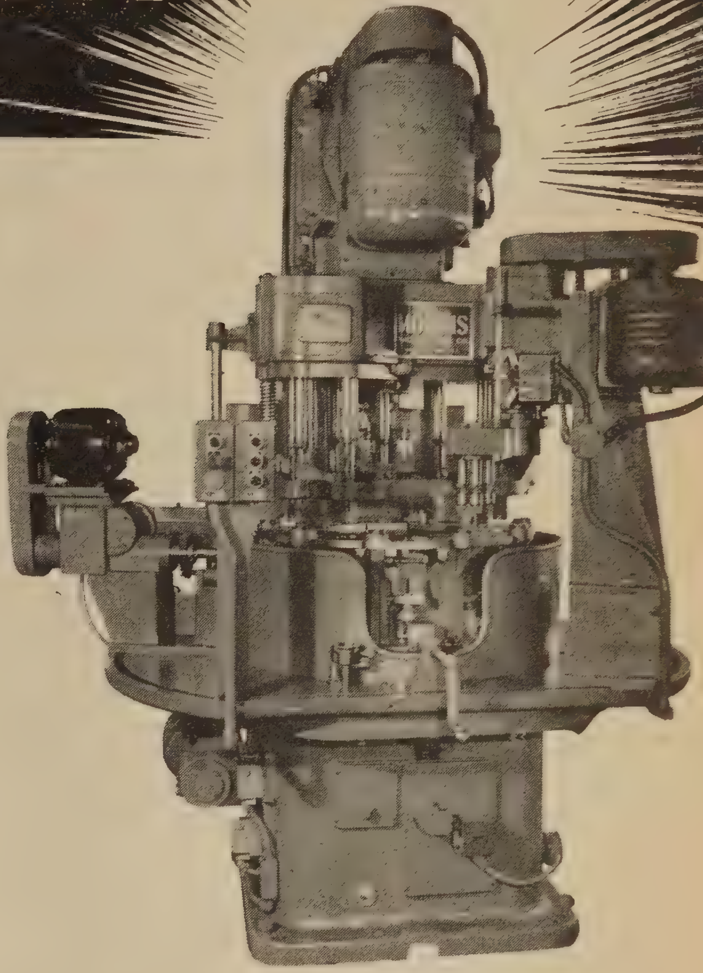
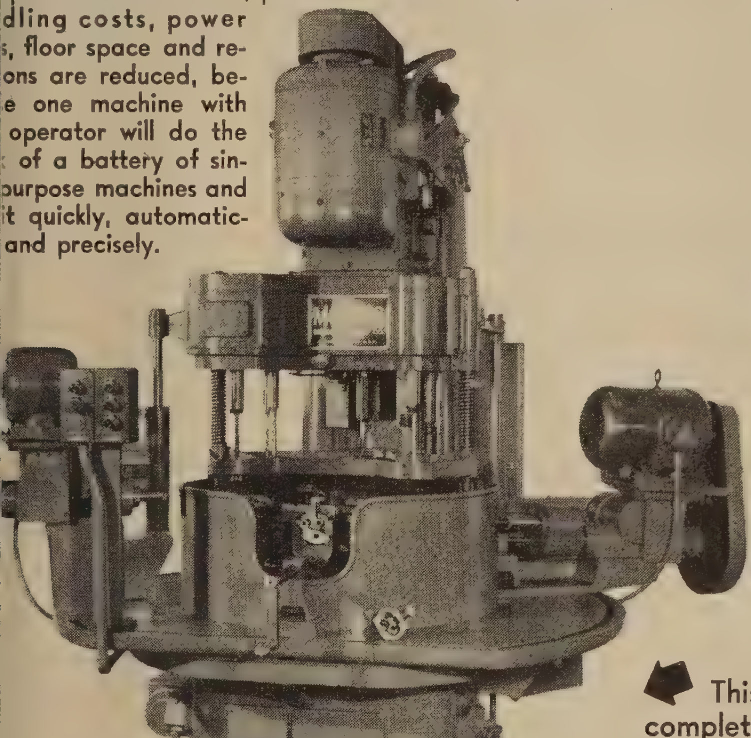
ne operator loads and unloads the work. The machining is automatic and continuous.

replacing lines of single purpose machines with MORRIS production machines, production labor costs, materials dling costs, power , floor space and re-ons are reduced, be-e one machine with operator will do the of a battery of sin-purpose machines and it quickly, automatic-and precisely.



This MORRIS hydraulic vertical ten-station machine was built to drill, ream and tap an automotive oil pump housing. Twelve vertical drilling spindles, two vertical reaming spindles, four vertical tapping spindles and one horizontal drilling spindle complete this work automatically and with precision. Ten hand clamping fixtures position the work.



This MORRIS hydraulic vertical six-station machine completely drills, reams, counterbores and spotfaces an automotive oil pump housing. It has four vertical drilling spindles, two vertical reaming spindles, one vertical counterboring spindle, three horizontal drilling spindles and one vertical spotfacing spindle. Six hand clamping fixtures position the work.

Builders of MOR-SPEED Lines

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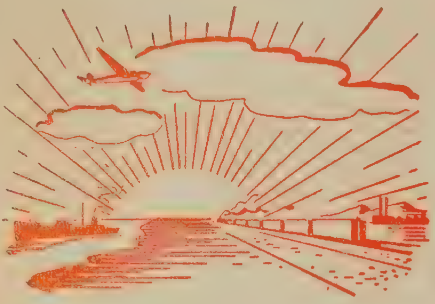
CINCINNATI 3, OHIO

West Coast . . .

ROBERT T. REINHARDT

• Kaiser's price hike of between 27 and 38 pct termed "knockout blow to western industry" . . . Significance of move is probed by businessmen.



SAN FRANCISCO—If any steel buyer in the West thought that Henry J. Kaiser was bluffing last fall when he said that the government's refusal to permit the refinancing of Fontana "leaves me at present with no alternative but to charge high prices for steel," that steel buyer had a rude awakening through the announcement that Kaiser steel was going up approximately $30 per ton on Aug. 15.

To adequately describe the reactions of steel users in the West to this increase which will apparently run from 27 to 38 pct would require several columns of adjectives such as "staggered, floored, bewildered, confused," etc.

Announcement of this $30 per ton increase in the price of those products produced at Fontana makes good on the second statement of Mr. Kaiser in September when he was making an attempt to get the government to forgive part of the RFC indebtedness on the plant. (THE IRON AGE, Sept. 11, 1947, p. 232). At that time he was seeking forgiveness of $34.5 million of the debt on the Fontana plant. Mr. Kaiser stated then that "Fontana is going to expand whether RFC writes off part of our debt or not." This expansion is already under way with another $18 million of RFC funds. Although detailed price lists were not available at press time it has been roughly calculated that this average of $30 per ton increase will net the Kaiser Co. approximately $17 million per year. This sum is arrived at by assuming that two thirds of 840,000 tons of ingot capacity of the plant will be sold in the form of finished steel and then apply the $30 per ton increase to that figure.

Many of the steel buyers who have been Mr. Kaiser's strongest supporters are now his most violent critics. They had long looked forward to the day when this independent producer would establish a western price for steel which would enable western fabricators and metalworking shops to compete with eastern plants.

When Kaiser's increases of $9.83 per ton were announced last month it was noted that the new prices showed no favorable difference as compared to competition, and it was pointed out that this was a disappointment to many. However, reactions to the latest $30 per ton increase might be likened to those of an atomic bomb as compared to a hand grenade.

Denunciations of the price boost were common but there were few customers of the Kaiser Co. who were so outspoken as Kenneth Norris, president of the Norris Stamping & Mfg. Co. and chairman of the Western States Steel Council in Los Angeles who said, "if that's where the price stays, all Henry Kaiser is doing is putting a lot of people out of business. Unless withdrawn, this new price will be a knockout blow to western industry, delivered by a man who talked so loudly about what he was going to do to build up western industry." It has been known that Norris Stamping has been producing wheels for the western assembly plants of Ford and Chevrolet at a very slim profit, and not long ago Mr. Norris made it known that any increase in the price of steel might put him out of the wheel business.

SOUTHERN California steel users are studying possible protests and contract adjustments to include the price jump if this proves unavoidable. Because Kaiser holds the whip-hand with a big backlog of orders and with other sources of steel closed to them, most of his customers refuse to be quoted directly but in private they indicated that the price rise will cause major changes in industry.

One major buyer, which recently was awarded a contract for construction work on Davis Dam began immediately to refigure work in an attempt to bring about a possible renegotiation of contract, or to see whether any profit at all can be obtained by carrying out the work order under the new steel price setup.

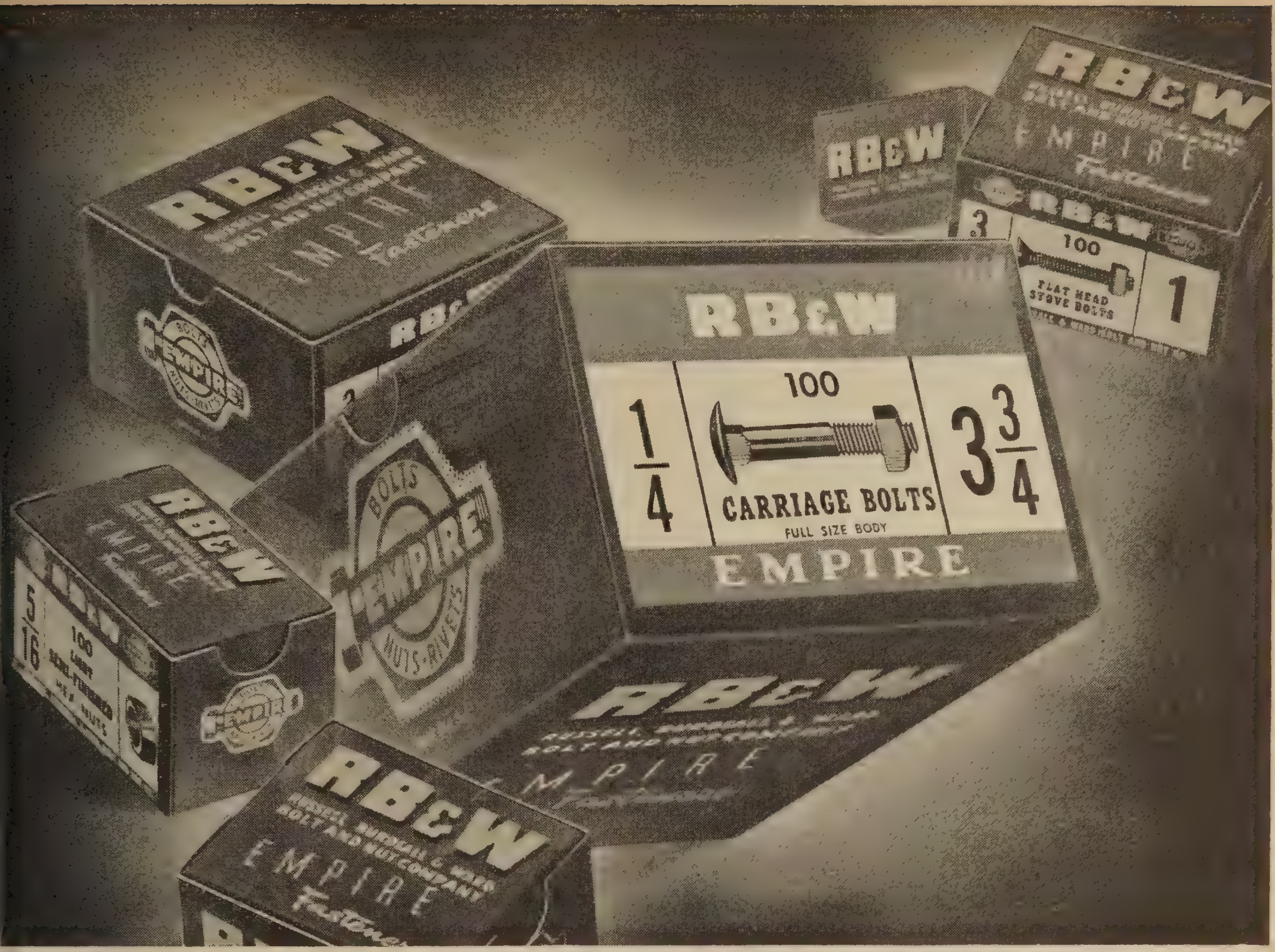
The contract, which is on a fixed price basis, was won on competitive bidding based on steel prices current a few months ago and possibly allowing for changes more in line with those in the East. The new raise throws the cost to a high bracket and Kaiser steel is needed to complete the job.

A manufacturer of heavy equipment indicated that his only solution was to tack 10 pct increase on sale prices. "Competitive sales already have forced us to cut our profits to the minimum and a price increase cannot be absorbed by the company," a spokesman said.

What the 10 pct increase on sales prices will do to volume will be another problem. Heavy equipment business already is slow in many lines at this time. Steel buyers faced with the possibility of having to pay $116 per ton for plate; $115 per ton for structural shapes; and $111 per ton for reinforcing bars; look back to the "good old days", when those same materials sold for $52 per ton, $54 per ton and $45 per ton respectively. Those were the prices quoted in the Mar. 21, 1940 issue of THE IRON AGE, f.o.b. Pacific Coast docks.

IT is pointed out that the two most recent increases in price announced by Kaiser Co. approximate the total cost of the same materials delivered to the West Coast 8 years ago.

While there is some sympathy evidenced by a few steel buyers over the heavy debt carried by the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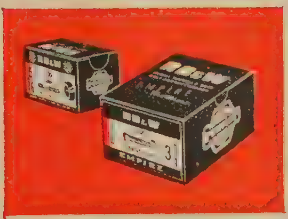

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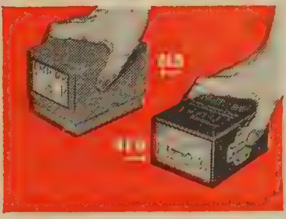

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103 Years Making Strong the Things That Make America Strong

Kaiser Co., at the same time these men feel that it is a little unjust for them to be expected to carry the full load of lifting that debt in which every taxpayer in the United States has an interest. The pledge made by Kaiser Co., Inc., in announcing its latest increase "when the excessive wartime cost has been absorbed, permitting refinancing of the private enterprise, then our customers will have the value of lower priced steel and of a great, competitive plant at Fontana which will be of tremendous benefit to the entire West," is but little solace to those steel buyers who now fear they will not be in business long enough to enjoy the "tremendous benefit."

While the announced reason and perhaps the most obvious reason for this latest advance in Kaiser prices is the desire to make enough money to pay off the RFC debt as quickly as possible, there are some observers who are prone to dig a little deeper into the subject. A comment of a well informed steel man here indicates that he is of the opinion the price increase was made now against the day when higher operating costs brought about by higher priced scrap might make such a move necessary. It was his thought that by bringing out the raise at this time when other price raises were being announced would create less antagonism than if a similar move were made 6 or 8 months hence. There are others who believe that Mr. Kaiser is swinging a "big stick" in an effort to stir up additional agitation in favor of a reduction in the RFC loan.

WHATEVER the strategy may be it is believed that many Kaiser customers were consulted on the possibility of accepting a price increase before the announcement was made. What such a poll may have revealed is a company secret but many of the more cynical and practical steel users seem to be taking the attitude that as long as the heavy demand exists, Kaiser will be able to sell his steel at his own price, but the reaction in the leaner years ahead will take on some of the aspects of a "lost weekend" hangover.

How seriously the shutting down of the 1200 ton blast furnace at Fontana will affect the ingot production is not yet determined although it is anticipated that only curtailment will result from having to use cold charges instead of the hot iron formerly supplied. Scrap stocks are good and it is believed that the openhearth can be supplied at capacity operations for this type of charge for the approximate 2 or 3 months necessary to reline "Bess". Close inspection showed that a complete reline job was desirable at this time, although at first it was thought a patch would suffice to enable quick resumption of operations.

* * *

With steel scrap scarce throughout the country and the depletio of iron ore reserve of the Mesab range predicted, steel producers c the West are questioning the advisability of shipping iron ore t Boeki Cho, the Japanese board o trade.

The Utah Construction Co. ha contracted to deliver 40,000 metri tons of iron ore from the Lindsa Hill mine in the Iron Springs district, Iron County, Utah. This initial commitment is expected to b increased and although no officia comments are available, it is understood that ultimately a smuch a 400,000 tons of ore will be sent t Japanese furnaces. Utah Construction Co. also supplies ore to Kaise Co. Inc., the Colorado Fuel & Iro Co. and Kaiser-Frazer Parts Co. i Utah.

Two shipments of 8000 tons an 9000 tons each have already bee made on ships of the Pacific Fa East line. It is anticipated tha shipments of this first order will b completed within 2 months.

While no official statement i available, it is believed that additional quantities of ore will be sol on bid and it is rumored that ther is a good possibility of as much a 250,000 tons being moved out of th Philippines. Under present freigh rates it costs $11 per long ton t ship ore from the Pacific Coast t Japan. Present shipments are moving out of the Long Beach harbo which can be reached at lowe freight costs than can the port c San Francisco.

A LONG LINK: Kaiser Co. is bringing its supply of iron ore nearer to the point of use with the construction of a new 52-mile stretch of track that connects their Eagle Mountain ore deposit with the Southern Pacific main line at Salton Sea, Farrum, Calif. Eighteen trestles had to be erected along the desert route to provide ample precautions against flash floods common to this area.

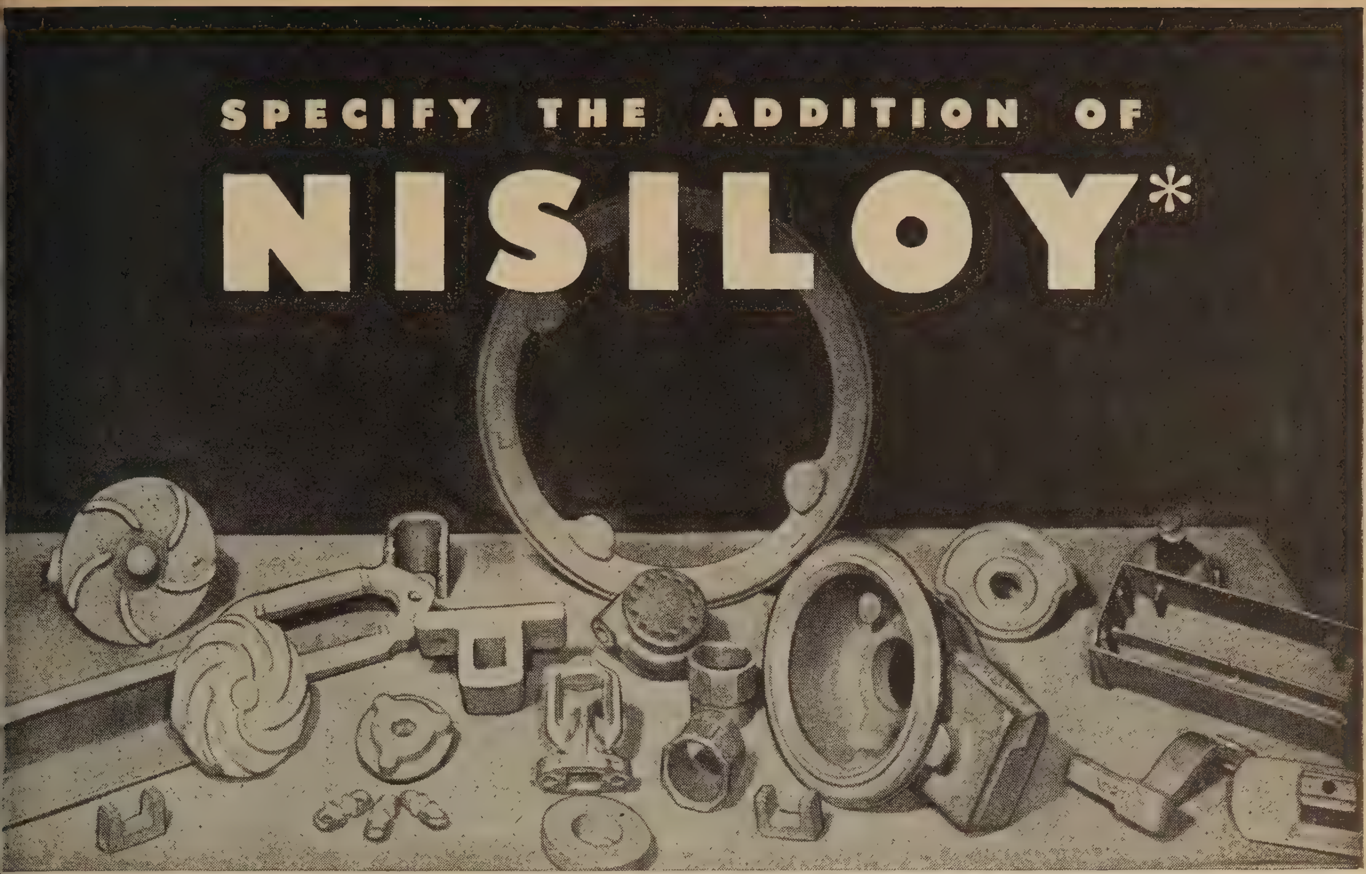
Ingot Production Gains

New York

• • • **In the first** 7 months c 1948 production of ingots and stee for castings totaled 50,145,401 ton compared with 48,917,242 tons i the similar period of 1947, th American Iron and Steel Institut announced.

Production of steel was set bac slightly in July to 88.8 pct of capacity from 93.8 pct in June, owin largely to idleness at coal mines i the early part of July. The outpu of the month was 7,078,123 tons c ingots and steel for castings, compared with June production c 7,256,354 tons. The July production was almost 500,000 tons large than in July, 1947.

SPECIFY THE ADDITION OF NISILOY*



Chilling and consequent machining difficulties were encountered by a foundry specializing in cast parts like these, designed with both heavy and light sections. Nisiloy, added to the ladle, assured ready machinability after many other experiments failed.

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Faster, easier, lower-cost finishing of gray iron castings may be attained because Nisiloy serves to eliminate localized hard areas or chilled (white) edges and surfaces . . . regardless of sharp variations in section thickness.

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Company...

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City...*State*.......................

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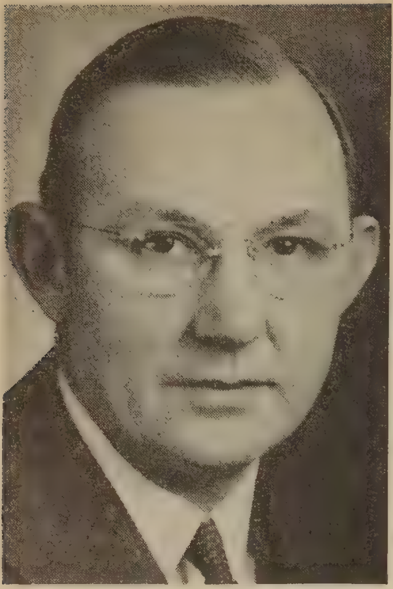
NEW YORK 5, N. Y.

PERSONALS



MARVIN W. SMITH, executive vice-president, Baldwin Locomotive Works.

• **Marvin W. Smith** has been elected executive vice-president of the Baldwin Locomotive Works, Eddystone, Pa. Mr. Smith came to Baldwin from Westinghouse Electric Corp. where he had been vice-president in charge of engineering and research.

• **L. J. Morrison,** vice-president in charge of sales, has been elected to the board of directors of Detroit Mold Engineering Co.

• **Elmer W. Cress,** vice-president and treasurer, has been named president, Buchanan Steel Products Corp., Buchanan, Mich. **E. T. Ross** has been elected treasurer.

• **J. D. Rollins,** formerly chief engineer of Carnegie-Illinois Steel Corp.'s Gary Works, has been made head of the planning engineering bureau of the corporation with his headquarters in Pittsburgh.

• **J. M. Haughey** has been appointed to the newly-created position of sales manager, Washington Iron Works, Seattle. Mr. Haughey has formerly been sales manager of the industrial division of Packard Motor Car Co.

• **Waldemar Naujoka** has recently joined the staff of Girard Associates, Chambersburg, Pa., as specialist on forge shop problems and sales. Mr. Naujoks was formerly manager of the forged valve division of the Ohio Injector Corp.

• **Howard Stevens** has joined Saval, Inc., Los Angeles, as head of industrial sales promotion. Mr. Stevens has been associated with the Watson-Stillman Co.

• **Walter G. Wheeler** has been appointed chief engineer, Hufford Machine Works, Inc., Redondo Beach, Calif. Mr. Wheeler joined Hufford in 1947.

• **A. E. Whyman,** managing director of E. W. Bliss (England), Ltd., has been elected vice-president in charge of European operations of E. W. Bliss Co., Detroit.

• **John F. Day** has been appointed sales representative for the northwestern sections of New York and Pennsylvania for George Haiss Mfg. Co., Inc., division of Pettibone Mulliken Corp., New York and Chicago. **J. Benatar** has been named sales representative for the company in the five boroughs of New York City. **H. D. Williams** has been appointed to repreesnt Haiss in eastern Pennsylvania and southern New Jersey.

• **W. G. Hancock** has been named president of the McCord Corp., Detroit. Mr. Hancock formerly served as vice-president in charge of operations.

• **E. H. Platz, Jr.** has been appointed manager of alloy sales for Lebanon Steel Foundry, Lebanon, Pa., succeeding **William B. Sullivan,** who retired recently. Mr. Platz joined Lebanon's executive staff in 1939 and in the intervening years has devoted considerable time to engineering and metallurgical application of alloy castings to jet engine and gas turbine development. ment.

• **Louis W. Mason,** Pittsburgh district manager of sales since 1946, has been appointed assistant to the general manager of sales, National Tube Co., Pittsburgh. **Henry C. Hoar** has been named to succeed Mr. Mason in Pittsburgh and **Glendon P. Robb** has been appointed manager of sales in St. Louis, succeeding Mr. Hoar.

CARL H. WITTENBERG, execu
tive vice-president, Gladdin
McBean & Co.

• **Carl H. Wittenberg** has bee
elected executive vice-president c
Gladding, McBean & Co., Los Ar
geles. Mr. Wittenberg has forme
ly been associated with Columbi
Steel Co. where he held the positio
of manager of the southern divi
sion.

• **O. E. Ostrom** has been appointe
purchasing agent for Southwes
Steel Products, Houston. Mr. Os
trom has been for many years wit
Carnegie-Illinois Steel Corp. an
Sheffield Steel Corp.

• **David F. Robinson** and **Williar
E. Rudel** have been appointed vice
presidents and districts sales mar
agers, Rudel Machinery Co., Inc
New York. Mr. Robinson ha
charge of the New York and Hart
ford territories and also the com
pany's Schenectady accounts. Mı
Rudel has been placed in charge o
the Boston office and the other fiv
New England states. **Ransom Sope**
has been placed in charge of th
Long Island territory. **George E
Tcimpidis** has joined the compan
as chief engineer. **J. E. Baxley** ha
been appointed hydraulic enginee

• **Robert J. Russell** has been electe
secretary, Hardinge Co., Inc., York
Pa. Mr. Russell joined the com
pany in 1929 as service enginee
and has specialized in the desig
and development of wet and dr
grinding systems. Mr. Russell ha
also been appointed chief of th
technical staff of the company.

(CONTINUED ON PAGE 148)

HOW CMP THINSTEEL IMPROVES PROFIT PICTURES

Cold rolled strip steel users who work with CMP Thinsteel frequently find their over-all production costs lower than when employing competitive products.

There's good reason. Thinsteel offers characteristics that are reflected in sharp reductions in fabricating costs and product improvement that enhances sales appeal.

Check these Thinsteel features and judge for yourself how Thinsteel can help to improve your profit picture.

MP
THINSTEEL
TRADE MARK

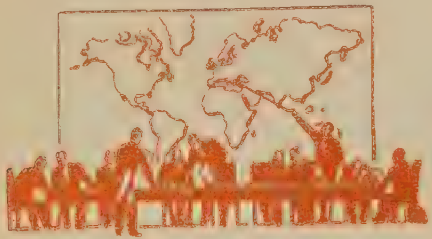
CHARACTERISTIC	WHAT IT MEANS TO YOU
WIDE RANGE OF ANALYSES IN CARBON, ALLOY AND STAINLESS GRADES	The analysis best suited to your end product requirement can be developed and produced to meet the particular fabricating problems involved.
CLOSE GAUGE TOLERANCES	More parts per ton. An average oversize variation of .002″ on .030″ strip means 6⅔% fewer parts per ton.
GAUGES THIN AS .001″	Lighter gauges with properly developed physical properties can often be used to replace heavier gauges, reducing weight without sacrificing strength or utility.
FINISHES FROM DULL TO MIRROR-BRIGHT OR ELECTRO-ZINC COATED	You have your choice of regular cold rolled for ordinary purposes, mirror-bright for plating and mirror-bright stainless or electro-zinc coated carbon steel for corrosion resistance.
EXTRA-LONG COILS	Fewer shutdowns for coil replacement on coil-fed machines. Greater per-day production.

C M P
PRECISION COLD ROLLED
STRIP STEEL

the Cold Metal Products co.
YOUNGSTOWN 1, OHIO

European Letter . .

• First real opening for counterattack in Eastern Europe offered by Tito's defiance . . . Propaganda by Western Powers would expose real nature of Soviet exploitation of Balkans and Eastern Europe.



LONDON—Several weeks have passed since the Cominform denounced the Yugoslav Communist leaders. Yet these heretics of Marxism are still firmly entrenched and quite unrepentant. The recent Congress of the Yugoslav Communist Party, held after an interval of twenty years, expressed complete confidence in Tito, and elected as secretaries of the party and members of its Politburo the very men whom the Cominform had singled out for attack.

The majority of the delegates in Belgrade were party members before 1941, and therefore most susceptible to an appeal from the Communist pope and cardinals in Moscow. If they remain loyal to Tito, it is unlikely that the wartime and postwar recruits to the party, who were mainly attracted by Tito's personality and by the Communists' war record, will desert the people's hero. Moreover, the army and police are thoroughly reliable. The generals are Tito's men, and "OZNA" (the secret political police) is controlled by one of the three colleagues of Tito whom the Cominform denounced by name. As for the mass of the Yugoslav people outside the Communist party, they may hate Tito and the OZNA, but they will not prefer Stalin and his secret police—the MVD.

Now that the Yugoslav Communists have dispersed, how do the results of the quarrel look to Moscow? Albania has been isolated. Bulgaria is now hostile to Yugoslavia. The revival of the quarrel between the Slavs for Macedonia will be an obstacle not only to plans for a Balkan federation but also to common action against Greece. So much for the Balkans.

THE central European Communist parties are variously affected by Tito's defiance. The Rumanian Communists have so little following in their country that they may have cynically resigned themselves to acting as foreign puppets. The Hungarian Communists, who have always been stronger as peacetime theorists than as wartime resisters of popular tribunes, may welcome the chance of gaining prestige in the eyes of Moscow. The belief that Tito is standing up to Moscow has encouraged Czech anti-Communists to raise their heads. Finally, the Polish Communists, who have had the hardest task of all owing to the age-long Polish hatred of Russia, must be dismayed at the proof given to the whole world that subservience to Moscow is the first of the duties of every Communist.

While Moscow's policy remains uncertain, what use can the western powers make of the conflict? First, the isolation of Albania should be exploited. Now is surely the time to exert the strongest pressure to put an end to Albania's continuing military support for Markos, and to demand the compensation due for the destruction of British ships by Albanian mines. Secondly, if Tito requires western economic help to survive against an eastern boycott, the western governments should consider what they can do. No help should be given without concrete returns. Finally, if there were to be signs of Soviet military preparations, the western governments should consider what they can and should do, whether they can afford to let Russian troops occupy Greece's northern frontier from the Adriatic to th Maritsa. The strategy that brough American aid to Greece and kep British troops there cannot ignor the Yugoslav situation.

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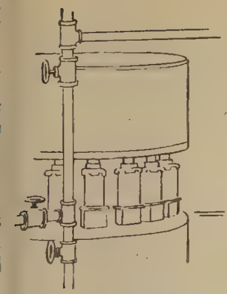
BUT the western governmen have a more general task o the highest priority, namely, propaganda which would expose the nature of Soviet exploitation. It wa refreshing to see that at the Danube Conference recently Si Charles Peake fired back at M Vyshinsky the epithet imperialis now used with such monotonou regularity by Soviet spokesmen i relation to the western powers. Si Charles rightly pointed out that th Soviets have obtained for themselves an effective monopoly o Danube transport in three riparia states. Western propaganda shoul point out that Soviet policy in eastern Europe and Germany is a systematic combination of economi political and national imperialism based on Soviet-controlled join companies, unequal commercia treaties, and the flooding of book shops and cinemas with Sovie books and films, to the profit of th Soviet publishing and cinem trusts. It should lay special stres on the inculcation of school childre with ready made Soviet idea whose ultimate aim is nothing les than the complete absorption o of every national culture by a amorphous, colorless Eurasia Moloch. Finally, since the point o which more than any other Europeans are vulnerable is the fear o a German revival, propagand should constantly remind them ho in Prussia, with the eager help o Feldmarschall von Paulus and Comrades Pieck, Ulbricht and Co. a ne *Gross-deutschland* is being prepared, how the supreme aim of Soviet policy in Europe is to reunit one *Volk* in one *Reich* under on *Fuehrer*—the "genial teacher o all progressive humanity," General issimo Stalin.

These are only some of th themes that could, with great effec be pressed home to the peoples o eastern Europe. It is time tha appeasement on the air, and M Bevin's rulings on the subject, cam to an end.

Prevent Contamination
...Use Globe Stainless Steel Tubes



If you have a contamination problem . . . if it involves tubing . . . consult Globe Steel Tubes Co.

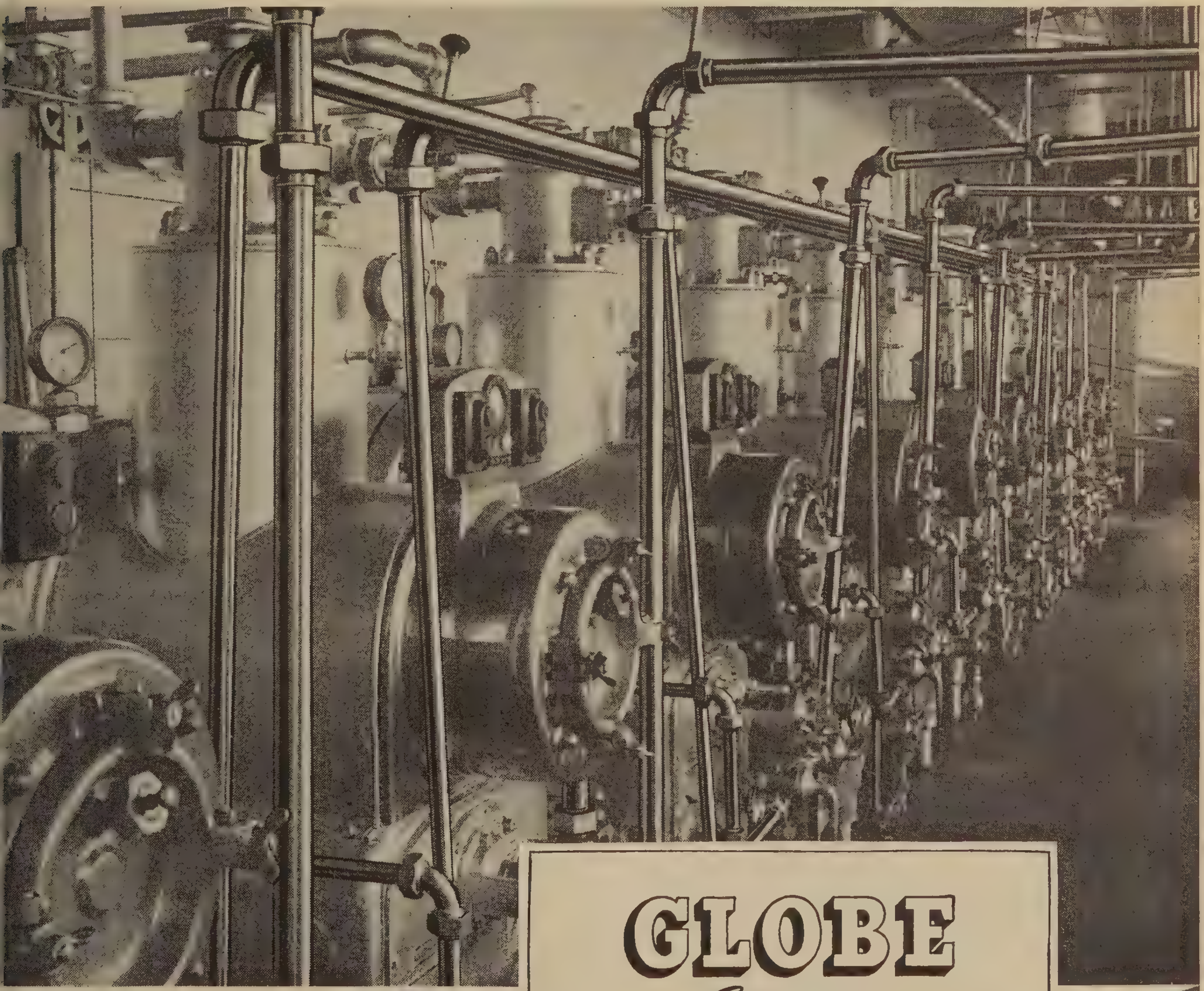
Why consult Globe? Because for 40 years they have been assisting processing industries to solve problems of contamination, sanitation, orrosion, scaling and other causes for tube failure.

Today's wide variety of stainless steels pose problems n selection . . . Globe Steel Tubes Co. has the experience nd "know how" to help you in selecting seamless stainless teel tubing or Gloweld (electric welded) stainless steel ubing in the exact analysis, size and finish you need. What's more, your requirements will be worked out in your plant and in cooperation with your engineers . . . tested and approved in the Globe Steel Tubes Co.'s fully equipped metallurgical, physical and chemical laboratories . . . to assure you most satisfactory results with a maximum of economy.

Let Globe Steel Tubes Co. assist you in surveying your tubing needs and you are assured of an outstandingly dependable source for steel tubing of all kinds: Stainless, Mechanical, Alloy Steel and Pressure . . . a wide range of sizes and types to meet your requirements . . . plus the engineering and research facilities to solve your tubing problems.

GLOBE STEEL TUBES CO., Milwaukee 4, Wisconsin.

Photo Courtesy Creamery Package Mfg. Co.



Free valuable technical data in Globe's new Stainless Steel Analysis Chart, Bulletin No. 301.

GLOBE
Stainless
STEEL TUBES

Industrial News Summary...

- ***Pressure Forces Arms Allocation Change***
- ***But Steelmakers Are Caught In Middle***
- ***Some Steel Buying Is Called Speculative***

THE STEEL industry has just sidestepped a political haymaker but left itself wide open for a black eye. Included in the voluntary allocations agreement for rearmament steel was a clause requiring a steel fabricator with a military order to use what suitable steel he had on hand before receiving an allocation. Last week the Commerce Dept. asked that this clause (Sec. 8) be eliminated. Requests to kill it ostensibly came from small manufacturers.

Though virtually certain that the pressure was more political than anything else, the steel industry representatives agreed to eliminate this clause. They are anxious to avoid trouble in Washington. But the industry has only dodged one blow. It is unlikely to come out of this fracas without a black eye.

Some steel sales officials have privately indicated their intention of filling rearmament allocations without question—but of cutting the normal commercial tonnage to that fabricator. This would prevent one steel consumer from profiting unduly at the expense of his competitor who does not have military orders, they argue.

If the steel industry acts this way the squawks in Washington will be loud. But if it takes steel from its regular customers and permits firms with military orders to step up their operations (and their profits) their slighted customers will be just as vociferous as the politicians. No matter which way they move, steelmakers will be criticized.

A mad scramble for military orders would follow any program that ignored commercial steel quotas for consumer goods and merely lumped armament steel allocations on top of them. Several steel executives have said privately that while some compromise might be worked out it is unlikely that commercial quotas to a given customer will be overlooked in considering his military steel needs. The small steel user however, will probably fare better in this respect than the big consumer.

STEEL consumers' number one worry of the week is the extent to which allocations will cut into their already rationed steel supplies. This makes some clamor for steel they don't immediately need for fear they'll not be able to get it later. The result is a headache for steel producers who argue that much of the buyer's concern is unwarranted and is prolonging the tight supply condition.

The facts are that a little more steel is being channeled into "must" programs. To date these programs have earmarked about 5.3 million tons of steel on an annual basis. Programs seriously being considered for voluntary allocations total almost 2 million tons more on an annual basis. If they are all approved they would siphon off perhaps 600,000 tons of steel a month in the last quarter of this year. This is about 9 pct of finished steel shipments at current production rates.

Voluntary allocations don't cut into total steel supply. Many consumers now receiving steel under voluntary programs would be getting about the same amount through normal commercial relationships. But allocations do work to the disadvantage of those not making "essential" products. This is what is worrying manufacturers of automobiles, refrigerators, office furniture and other consumer goods. And some of them are particularly concerned over growing tightness in alloy steel bars, a condition that will be intensified when military orders are stepped up.

A few customers, seeking larger quotas have approached steel companies in the past week asking if higher prices had pinched off any orders. Steel sales officials said "No", adding there was more likelihood of the average customer getting less, rather than more, steel in the months ahead.

SMALL mills are taking advantage of their legal right to negotiate individually with customers to meet competitive prices—provided the product involved is profitable. The larger mills don't find this practical. To accomplish the same end, to get into a distant market on business they want to keep, they have in a few cases established an f.o.b. mill price low enough to permit them to continue to compete.

Nut and bolt makers and stainless steel producers intend to meet competition—which they can legally do if they don't set up such sales on a "systematic" basis. But medium and large steel companies can't follow this practice on all products without disrupting their sales and order departments.

Several pig iron producers increased prices during the past week. The latest change sent THE IRON AGE pig iron composite price to a post war record high of $44.52 per gross ton. THE IRON AGE finished steel base price composite was revised this week to reflect second quarter shipment data just made available. It now stands at 3.75833¢ per lb.

Because all stainless steel producers did not increase base prices by the same amount these quotations are now in a state of confusion, especially since extra charges were sharply revised. Some warehouses are quoting prices differing widely from those of their competitors, depending on the mill supplying them.

But stainless steel is not the only point of price confusion. A Midwestern jobber is now buying pipe from four different sources with four different freight rates and some variation in prices. To avoid the possibility of losing money he will charge his customers the highest price he pays.

Steel operations for the week were tentatively scheduled at 94.5 pct of rated capacity, half a point above last week's revised rate of 94 pct.

WAIT A MINUTE—Western chambers of commerce ve asked for a 90-day delay on the $30 a ton average ice increase announced for Aug. 15 by Kaiser Co., Inc. hey wired RFC that the proposed increase will create so uch resentment among Kaiser's principal customers that e RFC loan may not be a good one when normal comtitive conditions return. The protest asserted that the crease can bankrupt certain of Kaiser's customers and use serious loss to many others. Kaiser contends the inease can be passed along.

A NEW HOME—The U. S. Steel units in Pittsburgh d the Mellon National Bank & Trust Co. will have a w home as soon as a 40-story skyscraper is erected at fth Ave. and Smithfield St.—in the city's Golden Trigle.

PLAYING BALL—Due to changes in methods of steel icing recently, some of the extras charged by Wisconsin eel Div. of International Harvester Co. were different an other producers in the Chicago area, some being higher d some lower. Consumers buying from different mills ere complaining about the variation in extras. For that ason Wisconsin changed all the extras on standard strucral shapes, effective Aug. 5, to comply with extras charged other producers.

MORE ALLOCATIONS—The Steel Products Advisory ommittee last week approved allotment of 4000 tons of eel to be used in tanker construction for the period Octor through February. A 2000 ton per month allocation to ver the same period in construction of research facilities r the National Advisory Committee on aeronautics was so approved.

FAST SHIPS—The Maritime Commission has awarded $50 million contract to Bethlehem Steel Corp. for conuction of the first two large postwar passenger vessels. ich of the ships will displace 29,705 tons and will have a speed of approximately 25 knots. Besides this provision unusually high speed, the maritime commission said it d written other national defense features into the conct. The ships will be 683 ft overall, and will be built American Export Lines, Inc., at Bethlehem's Quincy, ass. yards. The Bethlehem contract is the first under the million shipbuilding program approved by Congress for current fiscal year.

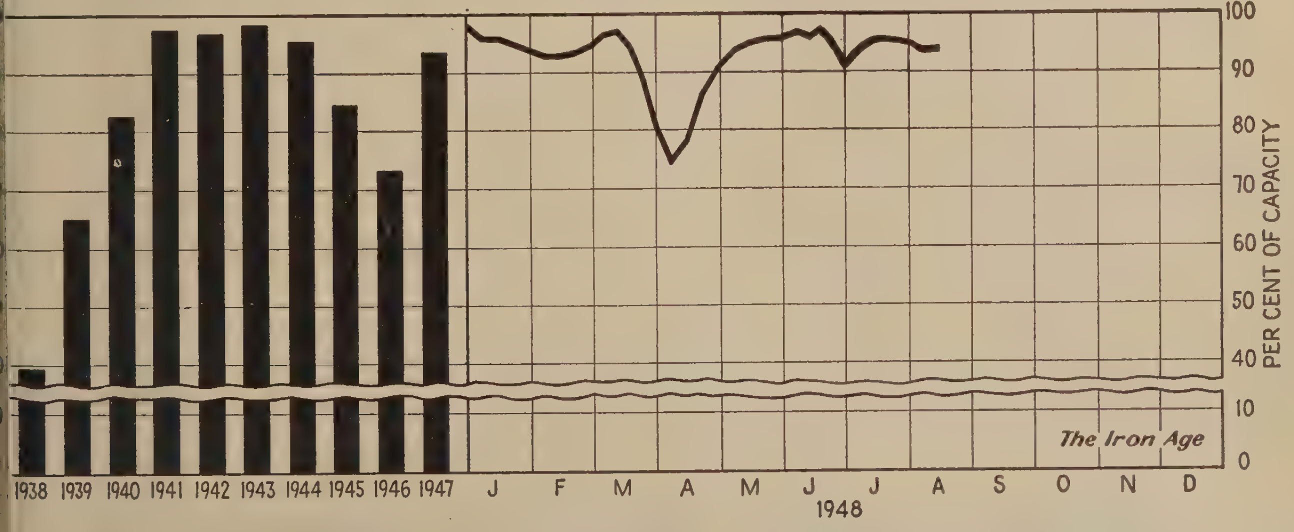
• **MUST GET STEEL**—They need steel badly—so several consumers have already approached WAA in an attempt to lease surplus government furnaces for ingot production. At least one such conversion is already underway, although it involves an already leased government plant rather than a direct WAA negotiation. In this case Westinghouse Electric Corp., Pittsburgh, has leased an idle furnace at United Engineering & Foundry Co.'s New Castle plant. Production of several thousand tons a month is to start in October—with ingots being shipped elsewhere for conversion.

• **NEW OVENS**—Expenditure of $1 million for the construction of 15 new byproduct coke ovens has been approved by directors of the Pittsburgh Coke & Chemical Co., Pittsburgh. The new ovens, to be added to the 70 ovens already in use at the Neville Island plant, will produce foundry coke which heretofore has never been produced in this area in any considerable quantity. Koppers Co., Inc., Pittsburgh, will furnish the ovens.

• **MORE OVERTIME**—Steel producers in the Chicago area have been using high school and college students to fill in their labor shortages. Next month they will lose such employees. Carnegie Illinois Steel Corp. estimates their loss through the back to school movement will mean about 1100 to 1200 fewer workers. Inland Steel Co. estimates they only have 250 such men on the payroll. To make up for this shortage, the mills will have to work their available employees more overtime than they have during the summer months. U. S. Steel Corp. believes the situation might be so acute that they are tentatively planning an extensive advertising program to solicit more help. Aside from radio, newspaper and car ads, the corporation is considering a television appeal for more workers.

• **CAPITAL INCREASE**—Working capital of United States corporations, exclusive of banking and insurance, rose during the first quarter 1948 while the amount of corporation debt decreased. According to the Securities & Exchange Commission, working capital hit a new high, as of March 31, of $62.4 billion while liabilities fell from a record high of $54 billion to $52.9 billion. Inventories rose somewhat to $43 billion.

Steel Ingot Production by Districts and Per Cent of Capacity



Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
95.5*	91.0	90.5	87.0	94.0	102.0*	102.5*	102.0	102.0	89.5	107.0	78.0	98.0	94.0*
97.5	91.5	91.0	87.0	95.0	102.0	102.5	102.0	102.0	95.0	106.0	78.0	98.0	94.5**

Say: "J&L JALCASE"- the original, free-machining, open-hearth steel—

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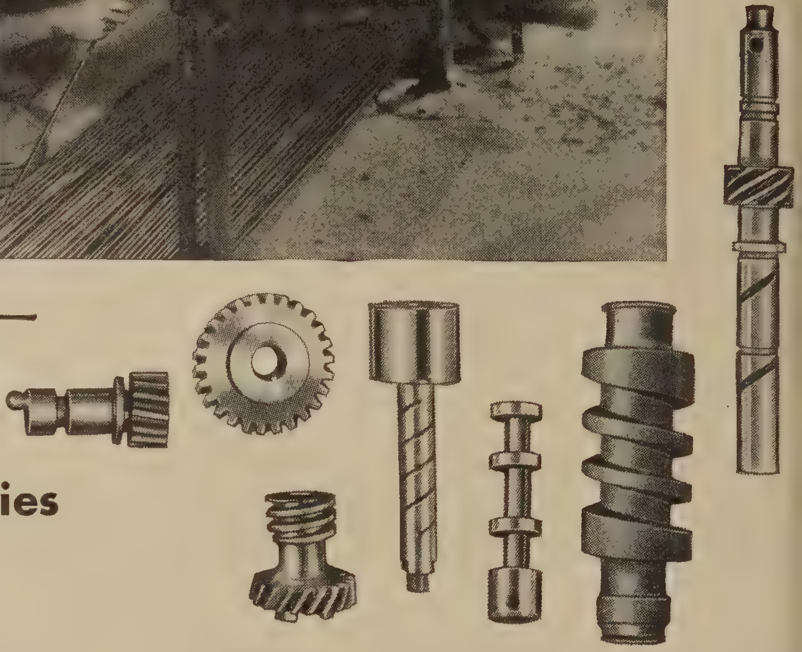
if you want the best in—



- √ **machinability**
- √ **heat-treating properties**
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There's more to J&L Jalcase Steel than a grade number. That's why, if you want the best, you must specify "J&L JALCASE."

- It is the *original*, free-machining, open-hearth steel.
- It still is the outstanding steel in its class today.
- Its machining properties closely approach those of Bessemer steel.
- It machines with a fine finish.
- It is easy to heat treat by conventional and high-speed induction methods.
- It lengthens tool life.
- It reduces production costs.

Jalcase is available in a range of grades to suit a wid variety of applications. It is supplied as cold-draw or cold-drawn-with-metallurgical-processing, which includes special tempering treatments. Thus many part made of this material may need no further heat treatment after machining.

Typical Jalcase analyses are found in the A.I.S.I. 110 series wherein the manganese content is 1.00% t 1.65%, such as in Grades C-1117 through C-1144.

Let us send you complete information on J&L Jalcase— the *modern* free-cutting steel. Write to: Jones & Laughli Steel Corporation, 403 Jones & Laughlin Building Pittsburgh 30, Pa.

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AMERICA'S FOREMOST PRODUCER OF FREE-CUTTING, QUALITY-CONTROLLED STEELS

The ADIRONDACKS — *Republic's Ace in The Hole*

○ ○ ○

By TOM CAMPBELL

News, Markets Editor

○ ○ ○

Mineville, N. Y.

• • • **Ten years ago** Republic Steel Corp. got a toe hold in the Adirondacks. Today it has a foothold—and a head start in Northern New York iron ore mining.

It is not farfetched to say that in the next 5 to 10 years Republic may be obtaining as much as 50 pct of its iron ore requirements from its Adirondack district. Certainly it will be getting much more than the present 16 or 17 pct.

The spectre of an ore shortage in the Mesabi region was making its initial appearance in 1938. But the reality of the situation was not quite as clear as it became a few years ago, or as serious as it is today.

It took imagination and foresight to start large scale development and production work on New York State lean ores 10 years ago. It was then that Republic leased the properties of Witherbee-Sherman Corp., including undeveloped ore lands in Clinton County. This is now known as the Port Henry district. A modern concentrating mill and sintering plant built during the war for the government are leased by Republic.

A year later Republic leased the famous Chateaugay mine and mineral lands together with a concentrating mill and sintering plant. By mid-1943 the property was purchased from the Delaware & Hudson R.R.

There was far more behind these acquisitions than the mere reporting would indicate. And there has been as much more behind the steady development and expansions in the past few years. As usual in such cases there is a colorful personality in the background.

The man who believed and caused others to believe just as strongly in the future importance of the Adirondacks is Don Gillies, a former Republic official and an unflagging and restless Scotsman. Still in his prime at 75, and now a consultant for Republic, Mr. Gillies can hold you spellbound with his quick rattling off of figures, history, geography and future of ore mining in New York.

No one at Republic's Northern New York mines questions the bald statement that without Don the potential of ore in these areas would have been set back—at a time when it could least be afforded. And it is equally as true that were it not for the top management of Republic and its ability to realize that vast sums of money spent in the Adirondacks were a quick and practical answer to problems still in the future, this district would not be humming as it is today.

There is a fierce pride in the hearts of Don Gillies, Joe Linney former Chateaugay boss and later Republic mine chief—miners and engineers know that Charley White, Republic president, is one of their biggest backers. He talks their language.

Ore mining in the Adirondacks is Republic's answer to the threatened shortage of open pit ore. The most frequent questions asked are "Is the ore good?" and "Are there substantial reserves?" Don Gillies says "Yes" emphatically to both questions. But it is not left to theory. Production records show it.

This year it is expected that Republic will produce close to 1,400,000 gross tons of concentrated iron ore running an average of 68.5 pct iron. The Chateaugay mine will produce more than 400,000 tons of finished product while the mines in the Port Henry area will make close to 1 million or more gross tons of concentrate.

But already development work goes forward in present mines. New drillings are constantly being made and current estimates may be too conservative. If sufficient labor were available in the Port Henry area Republic would probably be able to turn out much more than the expected million gross tons this year. And, says Don Gillies, Republic operating expanded properties at full capacities should be capable of producing 2,250,000 gross tons of sinter averaging 68.5 pct iron, 2 pct silica and "an extremely low percentage of phosphorous."

There is nothing mystifying about the concentrating and beneficiating of low grade ores. It just takes money, hard work and patience. Republic's men have all three. Their method is simple and the product has proven itself in their blast furnaces.

A brief description of their method at both Chateaugay and Port Henry is (1) the ore bearing rock is brought from depths running from 300 ft to 5000 ft, (2) it is rough ground, carried by belt to rollers where magnets hold onto the magnetite ore long enough to throw the large pieces of rock into another chute and belt to be disposed of quickly, (3) more grinding with magnetic separating gets rid of more rock. (4) small sized ore is ground smaller in rod mills and is then mixed with water and wet separation is made, throwing the fine rock into one chute to be disposed of and putting the ore which is now almost free from anything but iron oxide into another channel, (5) water is drawn off by vacuum leaving only a small amount of moisture in the ore which now goes to (6) the sintering bed after being mixed with hard coal ground as fine as sugar, (7) spread to a thickness of about 7½ in. on the moving bed the mixture is ignited and from the furnace it travels in large sintered pieces to the end of the table where (8) it is dropped down a chute into a railroad car. From there it goes to the steel plant or blast furnace.

There are far more complicated things taking place than described above but they are refinements of the basic action of separating the rock from the ore, first roughly in larger sized lumps and finally in smaller and smaller particles. The crushing to the proper size is not for concentrating purposes but to get the ore down to smaller lumps and get rid of large sized rocks by magnetic separation.

In the concentrating action where the ore is mixed with water inclined plate separators are used, which were invented by R. J. Linney, son of Joe Linney, the old timer. Here the ore is magnetically held on a belt while the rock is cast off screened and sold as byproduct. There is a continual flow of material which contains ore through the separating process until the last bit of iron oxide is salvaged.

Miles of rubber belting are used to carry the ore from process to process. There are storage silos at the end of one stage so that a breakdown in the mine will not mean shutting down the concentrating plant or a case of trouble at the concentrating plant will not back up into the mine. Ore is taken from the bottom of these storage bins. In the case of ores at Port Henry district there are three mines. The ore from each mine is kept separate from the time it is crushed until it is sintered.

IRON ORE MINED IN THE U. S.

District	Pct of Total 1918-1928	1946
Lake Superior	84.5	83.9
Birmingham, Ala., Chattanooga, Tenn.	10.2	8.4
Adirondack, N. Y.	0.6	3.1
Northern New Jersey and Southeastern New York	0.8	0.6
Other Districts	3.9	4.0

All ore mined at Chateaugay is low phosphorus ore. It is the major source of this kind of ore in the United States. That there will be much more of this ore for sometime to come is indicated by new development work now in progress at Chateaugay.

Republic is now starting open pit mining close to the present Lyon mountain mine which is expected to produce a total of 1,100,000 gross tons of crude ore. Close by, a new shaft will be driven as the firm starts to eventually take out 25 million tons of low phos ore. This new development will supplement the present one when it finally i worked out. There are still 5 to million tons of ore to be mined i the present Lyon Mountain pit.

Ores in the Port Henry mine range from 30 to 35 pct iron. Afte beneficiation iron content run from 68 to 69 pct, with little moisture. Leaner ores are picked u from time to time but only in exceptional cases are less than 25 pc ore bearing rock mined. The thre mines at Mineville are: Old Bed Harmony and Fisher Hill.

High grade ore, almost pure magnetite, has and is being mined fron Old Bed. About 20 pct of the output from this pit or 140,000 gros tons a year can be separated fron total mine output into lump or that will contain 61 pct iron. It ca be used as an openhearth feed or and is being delivered into the Ohi Valley regions at a cost which i competitive with Lake Superio lump ores.

On the question of productio costs of Adirondack ores compare with Superior ores, there is n clearcut answer when the argumen of freight hauls, etc., is dragged in The most concise and complet answer is that Republic is using th ore, it is spending a lot of mone to develop and produce more an more of it and it is maintaining it position productionwise and financially in the industry.

That should be enough of a answer. Yet if another one is needed read what Don Gillies say about the use of sintered ores. "Increasing the percentage of sinte in the blast furnace burden to a much as 40 to 45 pct of the metalli charge raises production from 10 t 19 pct, coke consumption is decreased about 15 pct, flux consumption reduced 20 pct and flue dus production cut as much as 50 pct."

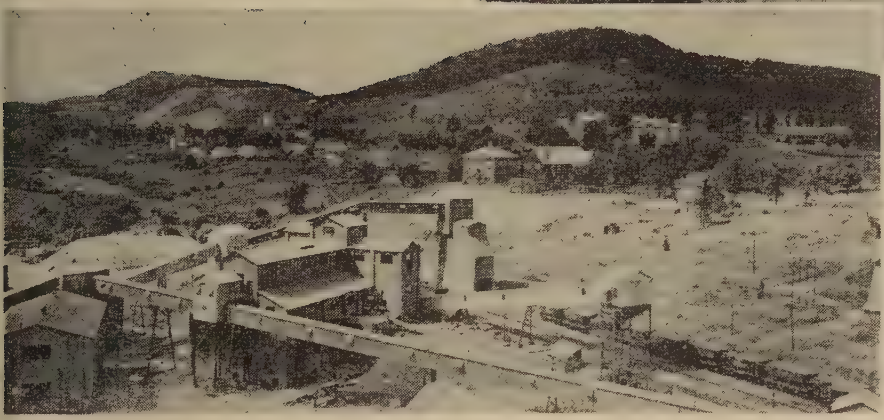
There are so many variables i the production and use of Adirondack ores that total steel makin costs tell the story—not isolate and perhaps theoretical argument based on only part of the whole picture. Then, too, after all is said an done the Mesabi open pit, cheape ores ARE running out. That is the fast revolving burr which furnishe part of the drive to cut costs, make refinements in methods and generally step up output of Adirondac ores.

That other steel companies are "Quite" interested in Northern New York ores is enough for Mr

(CONTINUED ON PAGE 122)

Bright Future Is Seen For Republic Steel Magnetite Ore Mines In Adirondacks

UNDERGROUND: An underground stope in a Port Henry mine. Rock has been blasted and is now being scraped down to a hole in the platform where it drops into a mine car and is brought to the shaft on that level. A skip takes ore up to the ground level where it goes to the cobbing plant. There it is ground to smaller size and large rock thrown out by magnetic separation.



HOIST HOUSE: General view of Mineville plant (above) showing hoist house, crushing and cobbing plants, schools, club buildings, office and hospital. About 1000 workers are employed but more could be used if they were available. Yes, there is a housing shortage here, too.

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SINTERING PLANT: Here is the heart of the matter. Ore from cobbing mill is ground to smaller size in rod mills. It is then magnetically separated by the wet process. When properly sized and concentrated, water is removed, coal is mixed with ore which is now 68 to 69 pct iron, mixture is ignited and resulting sinter is dropped into railroad cars for shipment to mills or blast furnaces.

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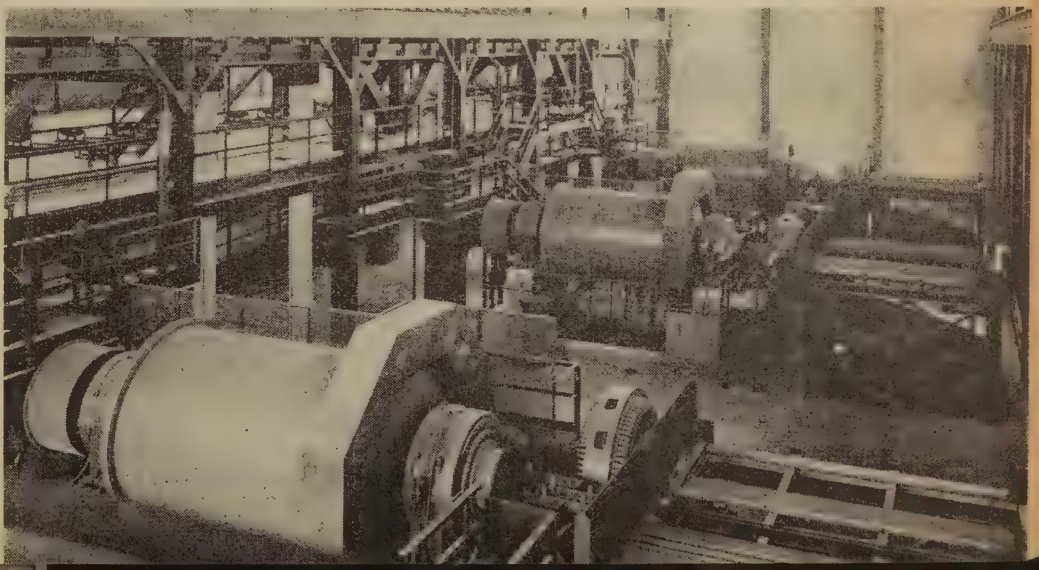


ROD MILLS: This is a battery of rod mills in the Mineville concentration plant. Ore is ground down to proper size by rods which tumble and roll as the mill turns. Adirondack ore mining is Republic's answer to the threatened shortage of high grade open pit ore. The ore is good and there are said to be substantial reserves.

Adirondack Ore

(CONTINUED FROM PAGE 120)

Gillies to drive in his last plug for what was once abandoned for the young and easy job in the Lake Superior region, but which is now being hailed as an ace-in-the-hole. But old timers who worked in the Adirondack mines years after their pappies helped get it out by hand say—she has been there all the time—just waiting.

The final proof of Republic's confidence in its men of the Adirondacks and their ding donging is an extensive program of diamond drilling in ore properties idle for more than 40 years. The work is now in progress in a 10 sq mile area northeast of Antwerp, N. Y., and straddling the St. Lawrence County-Jefferson County line.

Included are the Caledonia and Old Sterling mine properties. It certainly is great to have the president of a steel company Adirondack-iron-ore-conscious — that's what they say up this way as they wonder what new tricks that tireless Scotsman Gillies will be up to now.

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1948

(Preliminary)

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,768,497	95.5	343,169	77.5	361,110	79.0	7,472,776	93.6	1,686,857	4.43
February	6,245,338	94.3	340,596	82.3	354,270	82.9	6,940,204	93.0	1,676,378	4.14
March	6,841,578	96.6	363,235	82.0	403,322	88.2	7,608,135	95.3	1,717,412	4.43
1st Quarter	*19,855,413*	*95.5*	*1,047,000*	*80.6*	*1,118,702*	*83.4*	*22,021,115*	*94.0*	*1,693,932*	*13.00*
April	5,640,168	82.2	185,089	43.2	392,900	88.7	6,218,157	80.4	1,449,454	4.29
May	6,799,289	96.0	355,562	80.3	*416,801	*91.1	*7,571,652	*94.8	1,709,177*	4.43
* June	6,481,879	94.5	356,810	83.2	417,665	94.3	7,256,354	93.8	1,691,458	4.29
* *2nd Quarter*	*18,921,336*	*90.9*	*897,461*	*69.0*	*1,227,366*	*91.4*	*21,046,163*	*89.7*	*1,617,691*	*13.01*
* *1st 6 months*	*38,776,749*	*93.2*	*1,944,461*	*74.8*	*2,346,068*	*87.4*	*43,067,278*	*91.9*	*1,655,797*	*26.01*
† July	6,357,596	89.9	324,993	73.6	395,534	86.7	7,078,123	88.8	1,601,385	4.42
August										4.43
September										4.28
[illegible]										[illegible]

* Revised.
† Preliminary figures, subject to revision.

PRINTED IN U.S.A.

YEAR 1947

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,550,058	95.2	384,096	87.7	288,458	66.9	7,222,612	93.2	1,630,386	4.43
February	5,835,018	93.9	314,912	79.6	280,471	72.0	6,430,401	91.9	1,607,600	4.00
March	6,619,641	96.2	378,893	86.5	318,440	73.8	7,316,974	94.4	1,651,687	4.43
1st Quarter	*19,004,717*	*95.1*	*1,077,901*	*84.8*	*887,369*	*70.9*	*20,969,987*	*93.2*	*1,630,637*	*12.86*
April	6,365,670	95.5	375,675	88.6	310,497	74.3	7,051,842	93.9	1,643,786	4.29
May	6,640,004	96.5	372,878	85.2	326,132	75.6	7,339,014	94.7	1,656,662	4.43
June	6,317,705	94.8	351,247	82.8	308,762	73.9	6,977,714	92.9	1,626,507	4.29
2nd Quarter	*19,323,379*	*95.6*	*1,099,800*	*85.5*	*945,391*	*74.6*	*21,368,570*	*93.9*	*1,642,473*	*13.01*
1st 6 Months	*38,328,096*	*95.4*	*2,177,701*	*85.2*	*1,832,760*	*72.8*	*42,338,557*	*93.5*	*1,636,589*	*25.87*
July	6,033,512	87.9	256,125	58.6	289,048	67.2	6,578,685	85.1	1,488,390	4.42
August	6,329,497	92.0	346,033	79.0	315,622	73.2	6,991,152	90.2	1,578,138	4.43
September	6,152,348	92.5	334,425	79.0	310,684	74.6	6,797,457	90.8	1,588,191	4.28
3rd Quarter	*18,515,357*	*90.8*	*936,583*	*72.2*	*915,354*	*71.6*	*20,367,294*	*88.6*	*1,551,203*	*13.13*
9 Months	*56,843,453*	*93.8*	*3,114,284*	*80.8*	*2,748,114*	*72.4*	*62,705,851*	*91.9*	*1,607,842*	*39.00*
October	6,831,984	99.3	384,272	87.8	353,896	82.1	7,570,152	97.7	1,708,838	4.43
November	6,543,390	98.2	360,620	85.0	338,417	81.0	7,242,427	96.5	1,688,211	4.29
December	6,654,966	96.9	373,367	85.5	347,308	80.7	7,375,641	95.4	1,668,697	4.42
4th Quarter	*20,030,340*	*98.1*	*1,118,259*	*86.1*	*1,039,621*	*81.3*	*22,188,220*	*96.5*	*1,688,601*	*13.14*
2nd 6 months	*38,545,697*	*94.4*	*2,054,842*	*79.1*	*1,954,975*	*76.4*	*42,555,514*	*92.6*	*1,619,928*	*26.27*
Total	76,873,793	94.9	4,232,543	82.1	3,787,735	74.6	84,894,071	93.0	1,628,195	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 net tons Bessemer and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of January 1, 1947 as follows: Open hearth 81,010,990 net tons, Bessemer 5,154,000 net tons, Electric 5,076,240 net tons, total 91,241,230 net tons.

Steel Industry's 1947 Safety Record Is Best In Its History

Accident Frequency Rating Is Third Lowest Among 40 Major Industries

By STEVE SMOKE
Associate Editor

Chicago

• • • **The big push on** accident prevention in the past decade has made the steel mills just about the safest place in industry to work. Their ABC of safety—Always Be Careful—has paid top dividends.

Steel's 1947 safety record was the best in its history. The 6.08 disabling injuries for every million manhours of work was the third lowest in accident frequency among 40 major industries. This achievement is particularly notable since 1947 was also its greatest peacetime production year.

In each of the last 10 years the steel industry has been among the leaders in safety. This is the fifth time it has placed third in accident frequency. In 3 other years it was fourth and in 2 years it was fifth.

Comparison of figures seems to indicate that only the communications and electrical equipment industries are safer places to work. By a like token, it appears more dangerous to earn a livelihood in the tobacco, textile, rubber, leather or food industries. All this speaks well for the results steelmen are getting from their safety programs.

According to the National Safety Council, steel's accident severity rate during 1947 was also the lowest that has been recorded to date. The rate was 1.60 days lost for every 1000 manhours of work, as compared with a loss of 1.69 days in 1946. Here steel ranked twenty-eighth among the same 40 major industries.

Although big strides are being made in getting accidents down to a minimum—quite a problem remains in reducing the seriousness of those that do occur. In the meantime, while the solution to the severity problem is being solved, safety engineers have a pretty good tool to work with—don't get hurt at all. Each year they're getting closer to that goal.

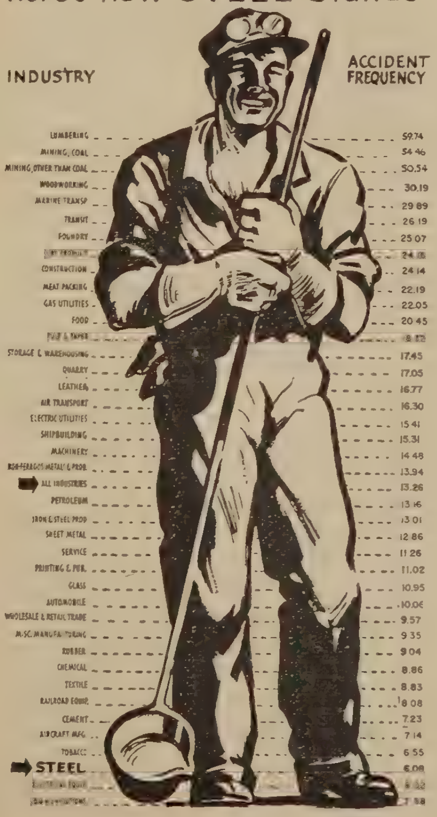
Attaining the 1947 record has been a long hard grind. It's taken a lot of work, planning and cooperation on the part of both management and workers. Hazards had to be eliminated, equipment replaced, remodeled or equipped with safety devices; new production methods incorporated; safety personnel organized and trained; and workers made safety conscious. But perseverence has brought success upon success as shown in a summary of the progress made since 1937.

CHANGES IN INJURY RATES FOR STEEL

Year	Severity Rate	Frequency Rate	Manhours, Millions
1937	2.07	8.51	.860
1938	1.84	6.56	.497
1939	1.77	6.57	.669
1940	1.68	6.54	.760
1941	1.75	7.02	.926
1942	1.97	7.37	.955
1943	1.87	7.41	1.050
1944	1.94	8.06	.862
1945	1.75	7.23	.975
1946	1.68	7.19	.767
1947	1.60	6.08	.983

(National Safety Council data)

Here's How **STEEL** Stands



Particularly significant, as shown in this table, is the fact that the new record in frequency was established with 983,465,200 manhours of work which is near the wartime peak of 1,050,785,000 manhours for 1943.

To indicate what a difficult task confronts the safety engineers in attempting to improve on the present record—the factors to which they give greatest stress are the same factors that contribute to the largest number of permanent disabilities. Here is what they have to contend with.

CAUSES OF DISABILITIES AND DEATHS

Unsafe Acts:	Pct
Unnecessary exposure to danger	27
Unsafe or improper use of equip.	15
Working on dang. or mov'g equip.	15
All others	29
Miscellaneous	14
Total	100

Personal Causes:	Pct
Improper attitude	47
Lack of knowledge or skill	33
Bodily defects	2
Miscellaneous	18
Total	100

Mechanical Causes:	Pct
Hazardous arrangement or procedure	41
Improper guarding	22
All others	21
Miscellaneous	16
Total	100

Despite these problems, an even brighter future can be envisioned for steel's safety. New equipment is being installed that was designed with safety precautions in view, new and efficient production methods are being put into effect, more emphasis is being placed on the proper training and supervision of workers and most important is the attention being placed on personnel relations.

Although improved mill equipment has been instrumental for much of the decrease in steel accidents, the personal causes of accidents—the improper attitude and unnecessary exposure—loom as the important targets to shoot at.

Here is where added stress is necessary—on the part of both management and labor—to mentally condition men for even further progress in safety.

Industrial Briefs . . .

• ZIRCONIUM PRODUCTS—F. W. Berk & Co., Inc., 420 Lexington Ave., New York, producers of mercury and mercurials, has entered the zirconium field as basic integrated producers of zirconium products at their plant in Wood Ridge, N. J.

• NEW OILITE PLANT—A major expansion program of manufacturing facilities has recently been completed by the Amplex Div. of the Chrysler Corp. The Amplex plant at 6501 Harper Ave., Detroit, has been enlarged and new equipment installed to provide improved service on oilite heavy duty oil cushion bearings and finished machine parts.

• ASM MEDAL—Dr. Willard H. Dow, president of Dow Chemical Co., Midland, Mich., has been elected to receive the American Society for Metals' Medal for advancement of research for 1948.

• STUD WELDING—A new customer engineering service department, under the direction of Robert C. Singleton, has been established by the Nelson Stud Welding Div. of Morton Gregory Corp. at its Lorain, Ohio, headquarters. This department will devote their entire attention to the development of new stud welded fasteners and production units.

• BUILDING LAB—Construction has started on a new $1 million research laboratory in Syracuse for the Solvay Process Div. of Allied Chemical & Dye Corp. by the H. K. Ferguson Co., in charge of designing and constructing the project.

• WESTERN OFFICE—Buflovak Equipment Div., Blaw-Knox Co., Buffalo, manufacturers of chemical and food processing equipment and large gray iron castings, has announced the opening of an office at 441 First National Bank Bldg., Houston.

• REPRESENTATIVE—White Metal Mfg. Co., Hoboken, N. J., manufacturer of collapsible tubes and metal can spouts, has appointed H. W. Clowe & Co., 401 Barnett-Madden Bldg., Jackson, Miss., its exclusive representative in the states of Alabama, Arkansas, Louisiana and Mississippi.

• GIFS GROUP—At a meeting of gray iron foundry management executives in Texas and Arkansas, a Southern Group of Gray Iron Founders' Society was organized with Charles R. McGrail, president, Texaloy Foundry Co., San Antonio, Tex., as chairman. At the next meeting on Sept. 17 a permanent organization will be set up.

• MORE RANGES—Admiral Corp., Chicago, is expanding its facilities to produce electric ranges. The company has taken over the electric range line formerly made by Pressed Steel Car Co. in Chicago. Admiral has taken a 20-year lease on the one story building.

• EXPANDS LAB—Cook Research laboratories, division of Cook Electric Co., Chicago, has started construction of a one story addition to its present facilities. This addition will double the floor space for the production of scientific instruments and research.

• LOCOMOTIVE PLANT—The General Electric Co. plans to build immediately a manufacturing building of 62,000 sq. ft in the central manufacturing district of Chicago. This plant will be used as a branch of the company's operations in the manufacture of diesel electric locomotive equipment.

• SALES OFFICE — Chain Belt Co., Milwaukee, has announced the opening of a new district sales office at 2900 West Clay St., Richmond, Va. Fred W. Taylor will be district manager of this office.

ASM Asks Iron Age Readers To Name Men For Alloy Steel Honors

Cleveland

• • • The American Society for Metals has invited readers of THE IRON AGE to submit names of men to be honored for their contribution to engineering alloy steels. Distinguished Service Awards will be made at the National Metal Congress & Exposition at Philadelphia, Oct. 25-29, 1948. The occasion is the 75th anniversary of the first engineering use of an alloy steel.

The society feels that by thus asking for nominations it can make broad exploration of a considerable group of men who are now too little recognized. A committee has been named to consider these nominations. It was emphasized that the committee seeks nominations of living individuals who can justifiably be honored for their contributions to progress in engineering alloy steels. Engineering alloy steels were stressed in contradistinction to tool steels and the high alloy steels.

Recognition will take the form of distinguished service awards to be presented at an event entitled, "A Salute to Alloy Steel." Chairmen of the awards committee is J. M. Schlendorf, vice-president, Republic Steel Corp. J. B. Foley, superintendent of research, The Midvale Co., is honorary chairman and R. A. Wheeler, manager of publicity, International Nickel Co., heads the visual and display committee.

Letters suggesting outstanding men in engineering alloy steels, with appropriate supporting remarks should be addressed to J. M. Schlendorf, Chairman, Distinguished Service Awards Committee, c/o Republic Steel Corp., Republic Bldg., Cleveland 1, Ohio.

Awards will cover a broad field. Men will be considered for discovery, perfection or promotion of metallurgical processes in ferroalloys and other raw materials as well as those involved in equipment and processes for making alloy steel, forging, heat treating, etc. Also eligible are those in research, inspection, composition and control and men who have promoted alloy steels. The committee says that it also seeks the names of men who have made notable applications of these steels in the consuming industries.

Hot Seat Testimony Exposes Gray Market Sales By Dummy Firms

Washington

• • • **If you can't** use any part of that last shipment of steel you received, ask the mill to take it back. Don't resell it for $300 a ton.

These proposals are advanced by a congressional investigating committee as a means of knocking out $200-a-ton and $300-a-ton steel. But these methods obviously will work only when a majority of steel consumers cooperate.

Representative Macy, Rep., N. Y., chairman of a House Public Works subcommittee investigating gray markets, hopes that this type of "continued cooperation of the steel industry and sincerely interested citizens" will place gray market operators into such "thorough disrepute" that the nation's entire steel output soon can be confined to normal business channels.

Capitol Hill investigators, headed by Mr. Macy, outlined their proposal at a recent hearing in which Myron Hokin, vice-president of Century-America Corp., of Chicago, was called in to explain how his company sold prime sheets and wasters through 27 dummy corporations at premium prices.

Mr. Macy declared that Century-America's sales methods were "very questionable" from the standpoint of good business ethics. "Certainly, by veiling its operations behind the cloak of numerous dummy corporations, the Century Steel Corp. very surely admits that there is something not quite wholesome connected with the sale of steel at gray market prices," he stated.

John T. M. Reddan, committee counsel, identified the Century-America Corp. as the parent company of Century Steel Corp.

Mr. Reddan charged that Mr. Hokin, acting through Century-America and the subsidiary dummy corporations of C-A, sold approximately 40,000 tons of premium price steel in 1947 and had sold about 15,000 tons in the first 5 months of 1948. "Did the producing mills know how you were selling this steel?" he asked Mr. Hokin.

"I don't know," Mr. Hokin replied.

"Did you try to keep them from finding out?" Mr. Reddan persisted.

Steel Consumers Are Asked To Return Steel Not Needed To Supplying Mills

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"I never told them," Mr. Hokin answered.

The committee counsel then asked Mr. Hokin if it was true that a number of steel producers had stopped selling to C-A and its dummy firms because of the extremely high prices charged by the Hokin organization.

Mr. Hokin admitted that he was no longer able to buy from certain stel producers.

"Didn't Armco cut you off?" Mr. Reddan asked.

"In effect, yes," Mr. Hokin answered. "They said they had been informed of certain things they didn't approve of," he admitted.

Mr. Reddan, in further questioning, brought out that such producing firms as Carnegie-Illinois, Youngstown Sheet & Tube, Jones & Laughlin, and Armco had quit selling to the Hokin organization. But Mr. Hokin testified that his firm still had open orders on its books with Inland, Republic, Weirton, and Wheeling mills. He said that many of these orders were for wasters, but that he hoped to obtain quantities of prime products in the anticipated shipments.

George Degal, sales manager for Metal Auto Parts, of Indianapolis, told the subcommittee his firm had received steel of sizes and gages it could not use and had sold some shipments to C-A.

"Why didn't you turn the steel back to the mill you bought it from?" Mr. Reddan asked.

"It didn't occur to me," Mr. Degal testified. But he added later that he would be "afraid to turn it back" because the producing mill might then "lessen its efforts to get us more steel."

"Couldn't you in the future return the steel you don't need?" Mr. Reddan continued.

"Well, I could try," Mr. Degal admitted.

Mr. Macy said that efforts on the parts of steel fabricators to keep steel in regular trade channels will "go a long way" toward holding down prices of steel and eventually other industrial commodities. He reiterated the request made by other congressional investigating

Coming Events

Aug. 30-Sept. 3 **American Chemical Society**, national meeting, Washington.
Sept. 6-10 **American Chemical Society**, national meeting, St. Louis.
Sept. 13-17 **American Chemical Society**, national meeting, Portland, Ore.
Sept. 13-17 **Instrument Society of America**, conference and exhibit, Philadelphia.
Sept. 28-Oct. 1 **Assn. of Iron & Steel Engineers**, Convention and Iron and Steel Exposition, Cleveland.
Oct. 4-7 **American Institute of Steel Construction**, annual convention, Quebec, Canada.
Oct. 5-7 **Industrial Packaging Engineers Assn.**, Industrial Packaging and Materials Handling Exposition, Chicago.
Oct. 5-9 **Concrete Reinforcing Steel Institute**, semiannual meeting, Asheville, N. C.
Oct. 11-13 **National Lubricating Grease Institute**, annual convention, Chicago.
Oct. 11-13 **American Society Tool Engineers**, semiannual meeting, Los Angeles.
Oct. 13-15 **Porcelain Enamel Institute**, annual forum, Urbana, Ill.
Oct. 18-22 **National Safety Congress and Exposition**, Chicago.
Oct. 22-25 **Metal Treating Institute**, annual meeting, Philadelphia.
Oct. 23-29 **American Society for Metals**, annual convention, Philadelphia.
Oct. 24-29 **American Welding Society**, annual meeting, Philadelphia.
Oct. 25-27 **American Institute of Mining and Metallurgical Engineers, Metals Div.**, fall meeting, Philadelphia.
Oct. 25-27 **American Gear Manufacturers Assn.**, fall meeting, Chicago.
Oct. 25-29 **National Metal Exposition**, Philadelphia.
Oct. 27-28 **Society for Nondestructive Testing**, annual convention, Philadelphia.

committees that producers refrain from selling steel to brokers and warehousemen who sharply increase selling prices over regular mill prices.

E. R. Ferguson, assistant committee counsel, named the following firms which he said were dummy corporations through which Century-America sold most of its steel at premium prices:

Anders-Central Co., Baker Fox Corp., Blanton-Ives Co., Carter-Cornell, Inc., Chase Bishop Corp., Chippewa Metals Co., Coral Corp., Craig, Wetmore, Inc., Esko Co. (formerly Conley Corp.), Graham Corp., Hubbard Western Co., Jordon Conners, Inc., Leeds-Root Associates, Inc., Pag Hollister Corp., Peck-Lorimer, Inc., Powell Logan Co., Inc., Proctor Ames, Inc., Quaid-Lemont Corp., Rowe Swann & Co., Inc., Stanton-Lister Corp., Winslow-Tripp, Inc., Releigh-Sherman, Trumbull Porter, Inc., Sinten Cole Corp., Barr Krum Metals Co., Sanford & Buhl Co., Cannon, Inc.

All of these dummy firms except Coral Corp., Mr. Ferguson said, were licensed to do business in Illinois. Coral Corp. was licensed to do business in Pennsylvania.

Given Leave For ECA Duty

Buffalo

• • • **Samuel S. Auchincloss**, vice-president in charge of the American Machine & Foundry Co.'s Pinspotter Div., has been granted a 1-year leave of absence to serve as head of the industry section of an Economic Cooperation Administration Commission to Sweden.

His group will make a study of the needs and potentials of the Swedish industrial economy to determine how it can help other European countries under the Marshall Plan.

Bi-Zone Will Get Mine Machinery Through ECA

Washington

• • • **New procurement** authorization for $1,625,000 worth of American coal-mining machinery for bi-zone Germany has been made by the Economic Cooperation Administration. An order was also approved for $2800 worth of molybdenum wire for mine use.

At the same time, procurement of $1,245,000 worth of nickel and lead from the United Kingdom, Mexico and Italy was approved.

AMERICAN IRON AND STEEL INSTITUTE
SHIPMENTS OF STEEL PRODUCTS
ALL GRADES INCLUDING ALLOY AND STAINLESS
(Net Tons)

JUNE - 1948
Month

Steel Products	Number of companies	Items	Current Month			To Date This Year			Whole Year 1947		
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	43	1	236,368	4.3	278,651	*1,529,028	4.7	*1,609,161	2,966,748	4.7	2,396,343
Structural shapes (heavy)	12	2	372,396	6.8	1,293	2,077,006	6.4	14,161	4,436,129	7.0	2,640
Steel piling	4	3	24,033	0.4	387	145,883	0.5	395	324,224	0.5	23
Plates (sheared and universal)	29	4	592,099	10.8	33,507	3,381,812	10.5	193,828	6,345,216	10.1	219,227
Skelp	6	5	11,098	0.2	39,688	74,044	0.2	205,748	160,989	0.3	384,004
Rails—Standard (over 60 lbs.)	4	6	173,107	3.2	1,433	973,284	3.0	5,956	2,207,146	3.5	991
—All other	5	7	15,948	0.3	36	118,933	0.4	708	211,900	0.3	329
Joint bars	7	8	11,575	0.2	4,302	71,438	0.2	20,492	173,923	0.3	15,198
Tie plates	7	9	43,388	0.8	50	248,886	0.8	261	504,779	0.8	4,437
Track spikes	8	10	13,319	0.2	43	70,777	0.2	139	163,746	0.3	146
Hot Rolled Bars—Carbon	34	11	524,725	9.6	54,882	3,089,895	9.6	316,242	6,242,416	9.9	745,770
—Reinforcing—New billet	16	12	107,606	2.0	976	661,596	2.1	3,809	1,277,075	2.0	9,775
—Rerolled	13	13	19,619	0.3	-	101,011	0.3	-	175,833	0.3	-
—Alloy	27	14	153,835	2.8	21,316	* 934,793	2.9	117,565	1,741,432	2.8	212,382
—TOTAL	44	15	805,785	14.7	77,174	*4,787,295	14.9	437,616	9,436,756	15.0	967,927
Cold Finished Bars—Carbon	27	16	108,756	2.0	513	661,092	2.1	2,727	1,426,701	2.3	9,249
—Alloy	26	17	20,379	0.4	958	109,561	0.3	2,963	218,802	0.3	2,601
—TOTAL	35	18	129,135	2.4	1,471	770,653	2.4	5,690	1,645,503	2.6	11,850
Tool steel bars	18	19	7,438	0.1	282	42,534	0.1	919	87,279	0.1	1,670
Pipe & Tubes—Butt weld	15	20	171,538	3.1	2,357	965,956	3.0	12,152	1,892,691	3.0	78,080
—Lap weld	8	21	24,275	0.5	-	169,065	0.5	3	389,762	0.6	875
—Electric weld	13	22	121,091	2.2	346	734,658	2.3	2,559	1,254,325	2.0	4,274
—Seamless	17	23	248,594	4.5	14,608	1,433,069	4.5	85,217	2,581,106	4.1	157,208
Wire rods	20	24	54,301	1.0	28,440	322,070	1.0	155,954	667,282	1.1	331,192
Wire—Drawn	39	25	230,416	4.2	15,364	1,351,161	4.2	90,747	2,590,963	4.1	181,783
—Nails and staples	17	26	73,677	1.4	1,139	433,034	1.3	7,177	799,436	1.3	8,481
—Barbed and twisted	15	27	22,018	0.4	23	132,597	0.4	73	256,991	0.4	128
—Woven wire fence	13	28	37,003	0.7	359	204,970	0.6	1,805	407,295	0.6	3,616
—Bale ties	11	29	11,290	0.2	-	61,761	0.2	-	119,917	0.2	-
Black Plate—Ordinary	9	30	70,553	1.3	92	395,699	1.2	654	801,745	1.3	2,033
—Chemically treated	2	31	1,268	-	-	7,608	-	-	19,252	-	-
Tin and Terne Plate—Hot dipped	8	32	182,412	3.3	48	1,011,201	3.1	167	2,093,149	3.3	228
—Electrolytic	9	33	151,444	2.8	-	862,101	2.7	215	1,617,659	2.6	529
Sheets—Hot rolled	32	34	637,585	11.7	53,988	3,826,170	11.9	325,356	7,891,798	12.5	578,426
—Cold rolled	16	35	526,929	9.6	1,499	3,285,116	10.2	9,809	5,504,578	8.7	28,498
—Galvanized	16	36	137,074	2.5	226	807,774	2.5	1,550	1,609,881	2.5	889
Strip—Hot rolled	23	37	138,690	2.5	26,806	820,417	2.6	171,142	1,740,085	2.7	308,655
—Cold rolled	34	38	152,252	2.8	1,671	874,228	2.7	11,942	1,613,005	2.6	28,030
Wheels (car, rolled steel)	5	39	29,303	0.5	96	163,307	0.5	621	356,873	0.6	2
Axles	5	40	19,372	0.4	14	102,398	0.3	97	185,019	0.3	53
All other	-	41	-	-	-	-	-	-	-	-	-
TOTAL STEEL PRODUCTS	140	42	5,476,774	100.0	585,393	*32,255,933	100.0	*3,372,314	63,057,150	100.0	5,717,765

During 1947 the companies included above represented 99.5 % of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Adjusted.

Weekly Gallup Polls . . .

Close European Military Alliance Favored By Voters

rinceton, N. J.

• • **Public sentiment for** a mili- ry alliance between the United tates and the Marshall Plan na- ons of Europe is on the increase.

This step toward more solid nity of the Western powers in fac- g Russia is approved by nearly ree out of four American voters lled, an overwhelming majority, cording to George Gallup, direc- r, American Institute of Public pinion.

The vote is one good indication at sentiment in the U. S. does not vor pulling out of Europe or re- rning to isolationism.

Whereas after the first war there as a general desire to have as lit- e as possible to do with Europe d her affairs, three years after e end of the second world war ntiment runs overwhelmingly in vor of so farreaching a step as a ilitary alliance in peacetime with whole group of European states.

The sounding of opinion was on e following issue:

"Do you think the U. S. and all e western European countries par- ipating in the Marshall Plan ould join together in a permanent ilitary alliance, that is, agree to me to each other's defense imme- ately if any one of them is at- cked?"

The same question was put to ters in May. The trend of sen- ment follows:

	May Pct	Today Pct
vor alliance	65	73
pposed	21	16
opinion	14	11

The one-sided vote in the poll is mptomatic of the fact that there comparatively little disagreement conflict in the minds of the nerican people today over foreign licy. The basic ideas of that licy—playing an active role in rope while displaying firmness ward Russia — find widespread blic support, and are causing ne of the deep rifts in public inion that Communist supporters are reported to hope they will cause.

On the issue of a military alliance with the Marshall Plan countries, Republican and Democratic voters see very much alike, with approximately 75 out of every 100 in both parties favoring such an alliance. The followers of Henry A. Wallace, who has opposed the Marshall Plan and who favors a softer American policy toward Russia, were found about evenly divided in the current poll, with a slight preponderance in favor of the military alliance.

■

And American Opinion Shows Overwhelming Support For Strong Policies In Berlin

° ° °

• • • **Whatever decision U. S.** diplomats and occupation authorities make in the present crisis in Germany, a poll of American people on the Berlin issue produces new evidence of overwhelming support for a tough policy toward Soviet Russia.

In a nationwide survey the institute asked this question of representative voters in all 48 states.

"Do you think U. S. and her western European allies should stay in Berlin, even if it means war with Russia, or should the U. S. give up Berlin to the Russians?"

The national answers:

	Pct
Stay in Berlin	80
Give up Berlin	11
No opinion	9

The voters of this country want peace, but the people have been shown to believe that the road to peace lies in a firm handling of our relations with the Russians.

In the words of Secretary Marshall, America "will not be coerced or intimidated in any way . . . At the same time we will proceed to invoke every possible resource of negotiation and diplomatic procedure to reach an acceptable solution to avoid the tragedy of war for the world."

Voters in each of the major parties see eye to eye on that policy as is shown by a comparison of the views held by Truman and Dewey voters on the Berlin question:

	Truman Voters Pct	Dewey Voters Pct
Stay in Berlin	82	83
Give up Berlin	9	11
No opinion	9	6

Even people who say they are going to vote for Henry A. Wallace are inclined to favor the present Berlin policy, despite their candidate's demand that the U. S. pull out of the German capital immediately. While more Wallace voters favor giving up Berlin than members of the major parties, almost half say America should not retire from the city.

Veterans of World War II are more adamant in their attitude than the rest of the country, 87 pct wanting the U. S. to hold its lines at all odds. The women of the country, supposed by some to want a "peace at any price" policy, hold almost the same views as male voters.

This poll shows once again that support for firm Russian policy does not come solely from business interests as Communists in this country constantly charge. Even the nation's manual workers vote overwhelmingly in favor of staying in Berlin, and they are only slightly less inclined to feel that way than professional and business people.

The following table gives the answers by various occupational groups:

	Stay in Berlin Pct	Give up Berlin Pct	No Opin. Pct
Prof. & Bus.	85	8	7
White Collar	80	11	9
Farmer	80	11	9
Manual Workers	78	12	10

MACHINE TOOLS

. . . News and Market Activitie

Prices Not Pinching Hard But Interest in Used Tools Is Brisk

Preliminary Reports Indicate July Orders and Shipments Will Show Declines

○ ○ ○

• • • **Despite the fact** that a number of qualified observers are on record with the pointed observation that higher prices won't sell more machine tools, bulk of the customer reaction in major sales sectors suggests that the new prices are not being felt too keenly.

On the other hand, it has been suggested that there is some similarity between the price of beefsteak and the price of machine tools, since both have ostensibly reached a point where buyers here and there are dropping out of the market. This position is substantiated to some extent by the current lively interest in used machinery, and the recent sales performance of the machine tool industry. Preliminary reports indicate that new firm orders in July will be off about 15 pct from the June level. Shipments will be off about 25 pct due primarily to the vacation periods. Cancellations will probably be about the same, or in other words, not heavy.

It is possible, as some sources allege, that buyers have become practically immune to price boosts in the present economic dilemma, but more than likely the answer to customer reaction lies in the fact that bulk of the machine tool buying stems from the big corporations, most of which have not been remiss in raising prices and so are faced with the situation from within and without, all along the line.

By and large, the industry is getting nowhere on the blocked shipments, nowhere on the ECA business, and nowhere on the defense program. This is by no means the fault of the industry or of any company thereof, but rather it is another indication of the slowness of government programs, and a general uncertainty which may be concomitant with an election year, but which is none the less spreading in certain segments of all industry.

The ECA program has unearthed a couple of interesting reports, first that European nations are more than willing to take gift money, but not so willing to take machine tools, and that there is the nucleus of a postwar machine tool industry in Europe, particularly France, that is alive and cooking, as they used to say in the infantry. This nucleus means competition to U. S. machine tool builders, for foreign governments have apparently long since understood better than the U. S. government the need for a strong machine tool industry.

Despite these discouraging notes, from a stock point of view there is more public participation in the machine tool industry today than there has ever been, according to reports.

In Detroit the response of buyers to recent increases in machine tool prices, was, on the whole, substantially less than the flurry occasioned by price boosts approximately a year ago. Some sources here have interpreted this as indicating a further thinning of the market.

There are, nevertheless, some decidedly encouraging aspects of the present machine tool situation. During the past week some Briggs buying was reported. There are also indications that a small program may be instituted at one of the Chrysler Divisions. The possibility that some substantial orders may grow out of the present activity at Saginaw Transmision of GM is also encouraging to machine tool suppliers.

Meanwhile, the possibility that Borg Warner orders may soon be placed for the production of an automatic transmission for Ford and others has been raised by several sources. Packard, it is understood, is already engaged in its tooling program for an automatic unit of the torque converter type.

Another future market for new tools of great importance is high compression engines which mo engineering sources are willing t predict will power most of the m tor cars of the future. Reports i dicate that pilot production of Ke tering-type high compression, ove head valve engines is about to sta at Lansing; a similar program a Cadillac is readying. It is also b lieved that Buick is prepared to i troduce a new engine with its pos war models which are scheduled fo introduction in about 4 months.

In the East, bulk of the comp nies in the June quarter kept abov the red line, but earnings per sha were less than in the correspondin quarter of 1947 in most cases. few continued out of the red i July, but earnings per share ofte were less than in June, and consid erably under July, 1947.

July was a quiet month, and fe tured a shortage of materials i some cases, including pig iro labor unrest and business unce tainty. According to reports, d mand was strongest for grindin equipment and milling machine with lathes coming in third. Po sible sales outlook for grindin equipment is very good, howeve in the third quarter, according t reports, probably as a result of th jet blade program.

Were it not for subcontractin some companies in the East woul have been in for a hard time of i with another round of wage i crease, higher material costs an lower sales volume.

In Cincinnati, Cincinnati Millin Machine Co. has reported a co solidated net earnings of $600,61 after income taxes of $423,430 fo the second quarter of 12 weeks en ing June 12. Net is equal to 64 a common share on 850,000 shar outstanding after preferred div dends and compares with earning of $2 a share or $168,961 for th second quarter of 1947. Frederic V. Geier, Cincinnati Milling M chine Co. president, said shipmen were ahead of the correspondin quarter of last year, and that u filled orders were above the Jan ary 1 level.

5 Kinds of

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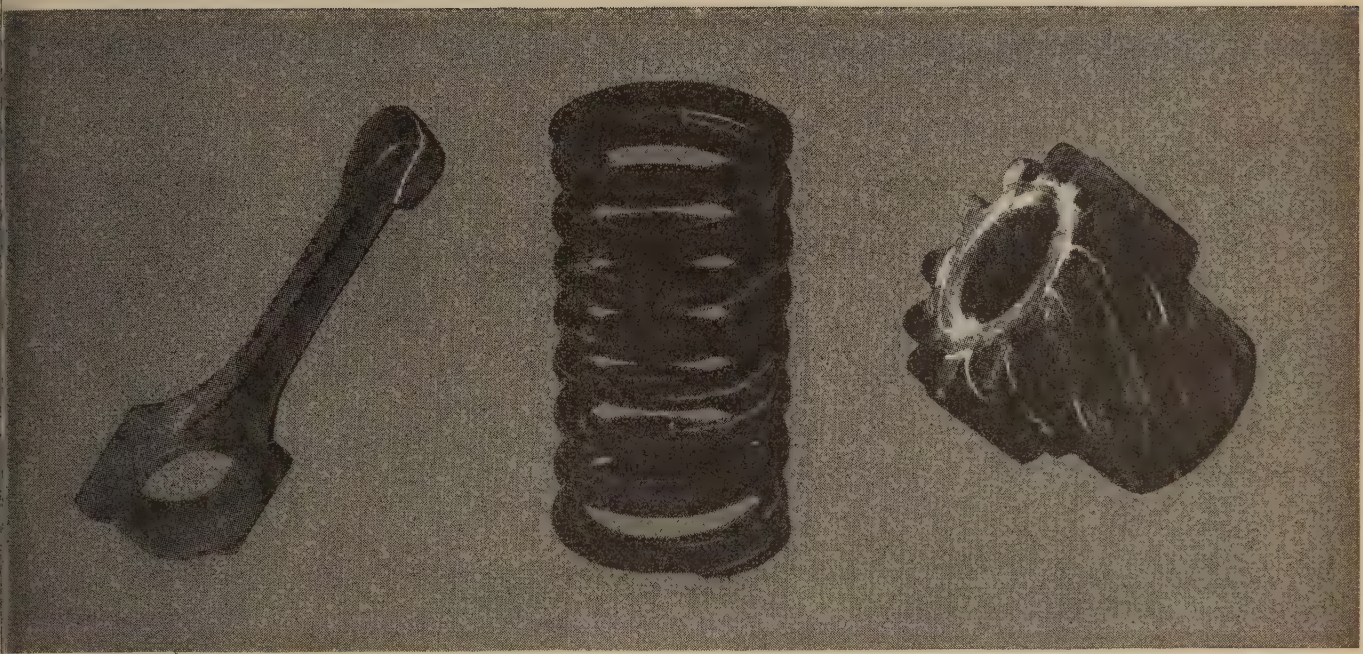

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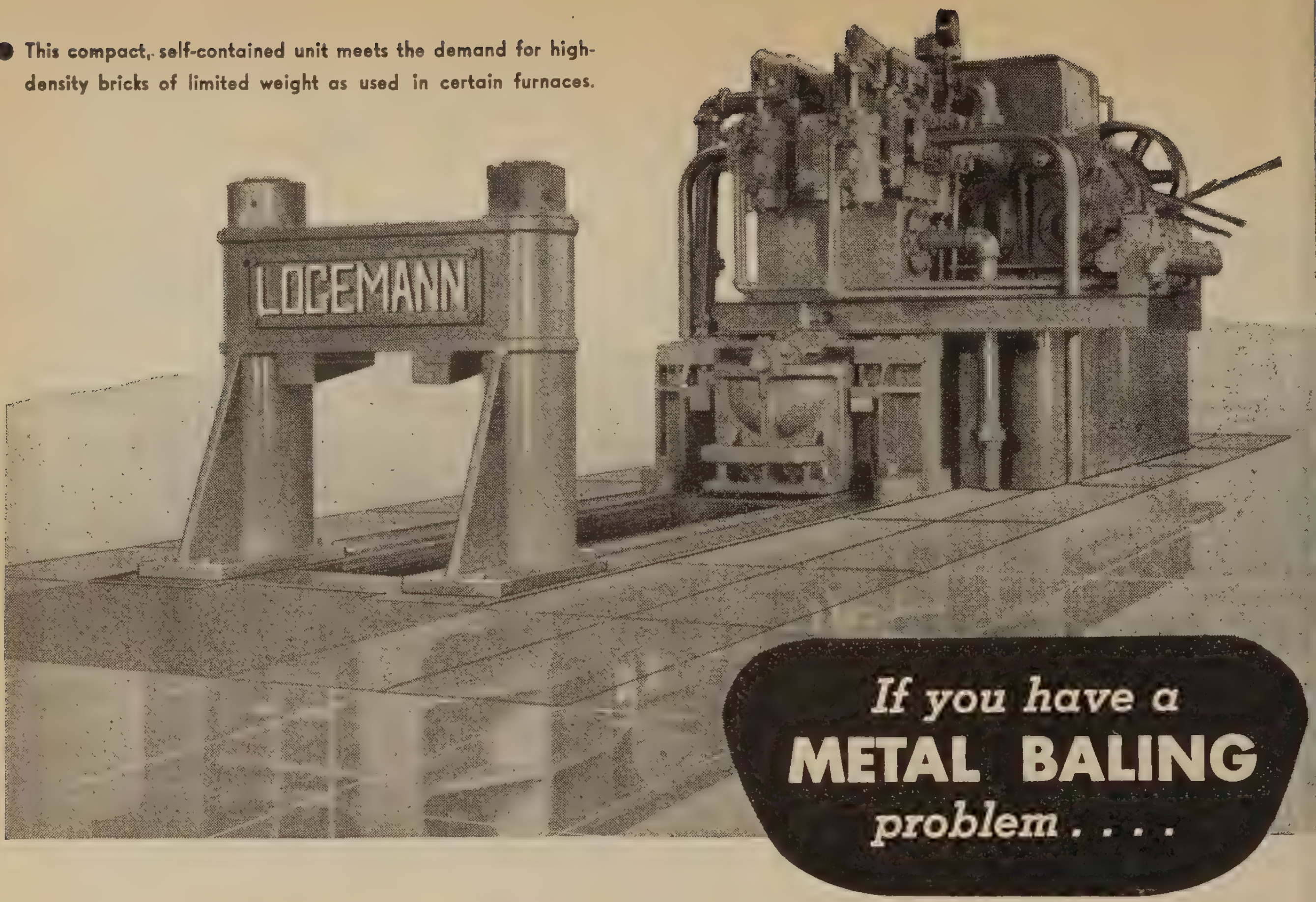

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Prices Steady As Shipments Stay Sluggish

New York

• • • **The market** remained steady pricewise this week with steelmakng grades leveling off at the formula price. Flow of scrap continues at the rate prior to the price increase with no additional material showing up.

In Buffalo, cast iron scrap jumped $3 a ton on an order for a substantial tonnage of mixed cupola cast at $64, placed by one of the big foundries. Charging box ast and stove plate each moved up $1 a ton above their previous levels o $59 to $60 and $62 to $63.

In steel producing centers, the rend toward reciprocal agreements continues with increasing tonnages being diverted from the free market and brokers' channels.

Numerous complaints about overhe-formula prices continue to be heard in many quarters. In Buffalo, competition for scrap was so strong that papers there carried half-page ads offering $33 a short on for mixed and $31 for sheet scrap, or $2 over prices previously paid peddlers.

In Chicago, higher than market price sales so far have been in small tonnages at about $1 over the market. There, and in Cleveland major consumers have been plugging for lower prices and as a result Chicago brokers have pulled in their $42 offers on heavy melting grades and are now back offering $41.50 for the large mills.

Despite controversy over prices and reciprocal agreements, the demand for scrap is strong and any efforts made to build up stockpiles are meeting with little success. Unless additional scrap appears on the market in the near future, many mills will have trouble keeping oprations at capacity levels.

•

PITTSBURGH—The market was steady pricewise with a 50¢ advance in rail specialties being the only change. Movement continued to be rather slow, with prices through the whole list remaining very firm. The trend toward reciprocal agreements continues with increasing tonnages being diverted from the free market and brokers' channels. Everyone, however remotely connected with the industry, is anxious to pick up all the material that can be pried loose. Rumors of over-formula buying are circulating, and springboards on out-of-district tonnages are reportedly being stretched—especially for quality material. But the bulk of the Pittsburgh district business is still at the new formula even though some observers believe a testing period on the prices is near at hand.

•

CHICAGO—Higher than market price sales so far are in small tonnages at about $1 over the market. Brokers have pulled in their $42.00 offers and are back offering $41.50 for the large mills. Foundry prices are all over the lot. Turnings and borings are bringing fancy prices, mostly by bundlers. A typographical error occurred in last week's railroad heavy melting price, the price should have read $44.25 to $48.50. The low figure is the earmarked price, the top figure is the free market price. Scrap rail prices are still in a chaotic state. The wide range in rerollers represents the difference between purchases by large mills and smaller buyers.

•

PHILADELPHIA—Scrap is moving in good volume at the recently increased prices, but observers fear that the tonnage is not sufficient to provide a margin for the winter's requirements. Openhearth and blast furnace grades are firm at quoted prices, but there is no longer a strong bullish sentiment in the market. Low phos is quoted 50¢ higher. Cost grades are not quite as firm as others as steel mills and foundries seem to be adequately supplied. Foundry requirements are less due to the lower rate of operations due largely to the shortage of pig iron.

•

CLEVELAND—Something is brewing in the scrap market and it could be that major consumers are getting ready to abandon the formula. The formula looked beautiful on paper but it put a bottom in the market. Or from another angle the formula has given the market stability at the top or close to it. Some market sources believe that it has sustained and encouraged high prices. Market conditions here and in the Valley are virtually unchanged since before the $2.50 increase. Very little material is moving and the bulk of it is earmarked. Most major consumers are doing well to get consumption back in shipments. Quality is poor and dealers' yards are practically empty. Brokers report they cannot buy except spot tonnages here and there. With or without the formula, it looks like a rough winter.

DETROIT—Up to the present time scrap flow here has been at earlier levels despite shutdowns of 5 plants by the Campbell, Wyant and Cannon strike at Muskegon. Prices of openhearth grades are holding at previous levels but reports of sales at over-the-formula levels continue to be heard. With the completion of major automotive die programs, many Detroit scrap iron foundries are operating at reduced levels and the demand for cast is indifferent. Prices are holding, however, and better grades continue to bring up to $5 premium over quoted prices. A car of clean auto cast was held here this week by the seller in the face of an offer of $70.

•

BUFFALO—Steel making scrap leveled off last week at the new mill formula. With dealers assured of additional orders as fast as they complete present contracts. Cast scrap jumped $3 a ton on an order for a substantial tonnage of mixed cupola at $64, placed by one of the big local foundries. Electric furnace and rail specialties were quiet spots. Competition for scrap was so strong that one of the large yards ran a half-page display ad in local papers offering $33 a short ton for mixed and $31 for sheet scrap or $2 over prices paid peddlers previously. Mill receipts were improved and one leading consumer was reported adding some tonnage to reserves.

•

CINCINNATI—With all grades in strong demand the market here seems to be repeating itself. That is, all factors that were present before the recent boost in formula prices are again present and making themselves felt. All consumers including foundries are battling to get some inventory down. Openhearth consumers are getting some material but mostly earmarked. Prices anywhere from 50¢ to $2 over the formula are being paid, with marginal or out of the district consumer the principal offenders.

•

NEW YORK—Conditions remained static pricewise this week. The market continued strong with shipments moving quite freely, although there was a slight tightening up due to vacations and falling off of production. Chemical manufacturers were not in a buying mood mainly because of large inventories and failure of finished products to move. Due to a typographical omission we failed to quote shoveling turnings last week at $33.50 to $34.

•

BOSTON—With the new formula figure well established, there isn't any change in the scrap market. The demand continues good, chemical borings continue to be a drug on the market and many dealers refuse to quote a price for this. Machinery cast, on the other hand, is hard to get, and a seller can almost name his price. While stove plate continues $51 to $51.50 f.o.b. Boston, it commands $5.00 more a ton outside the section.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.50 to	$43.00
RR. hvy. melting	43.50 to	44.00
No. 2 hvy. melting	42.50 to	43.00
RR. scrap rails	57.00 to	58.00
Rails 2 ft and under	62.50 to	63.50
No. 1 comp'd bundles	42.50 to	43.00
Hand bdld. new shts	42.50 to	43.00
Hvy. axle turn.	44.00 to	44.50
Hvy. steel forge turn	44.00 to	44.50
Mach. shop turn	37.50 to	38.00
Shoveling turn.	39.50 to	40.00
Mixed bor. and turn	37.50 to	38.00
Cast iron boring	39.50 to	40.00
No. 1 cupola cast	64.50 to	65.50
Hvy. breakable cast	55.00 to	56.00
Malleable	76.00 to	77.00
RR knuck, and cup	58.50 to	59.50
RR. coil springs	58.50 to	59.50
RR. leaf springs	58.50 to	59.50
Rolled steel wheels	58.50 to	59.50
Low phos.	49.50 to	50.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy, melting	$41.50 to	$42.00
No. 2 hvy. melting	41.50 to	42.00
No. 1 bundles	41.50 to	42.00
No. 2 dealers' bundles	41.50 to	42.00
Bundled mach. shop turn.	39.50 to	40.00
Galv. bundles	38.00 to	38.50
Mach. shop turn.	36.50 to	37.50
Short shov. turn.	38.50 to	39.50
Cast iron borings	38.00 to	40.00
Mix. borings and turn.	36.50 to	37.50
Low phos. hvy, forge	51.00 to	52.00
Low phos. plates	49.00 to	50.00
No. 1 RR. hvy. melt	44.25 to	48.50
Rerolling rails	62.25 to	67.75
Miscellaneous rails	61.00 to	62.00
Angles & splice bars	59.00 to	60.00
Locomotive tires, cut	60.00 to	61.00
Cut bolster & side frames	54.00 to	55.00
Standard stl. car axles	72.00 to	73.00
No. 3 steel wheels	57.50 to	58.00
Couplers and knuckles	57.00 to	57.50
Rails, 2 ft and under	64.00 to	67.00
Malleable	82.00 to	83.00
No. 1 mach. cast	74.00 to	75.00
No. 1 agricul. cast	68.00 to	70.00
Heavy breakable cast	63.00 to	65.00
RR. grate bars	67.00 to	68.00
Cast iron brake shoes	60.00 to	61.00
Cast iron car wheels	63.00 to	64.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.00 to	$42.00
No. 2 hvy. melting	41.00 to	42.00
No. 1 bundles	41.00 to	42.00
No. 2 bundles	41.00 to	42.00
Mach. shop turn.	35.50 to	36.00
Shoveling turn.	37.50 to	38.00
Cast iron borings	35.50 to	36.00
Mixed bor. & turn.	35.00 to	35.50
Low phos., plate	48.50 to	50.00
No. 1 cupola cast	66.00 to	68.00
Hvy. breakable cast	58.00 to	59.00
Rails 18 in. & under	61.50 to	62.50
Rails random length	56.00 to	58.00
Drop broken	70.00 to	71.00

BOSTON

Dealers' buying prices, per gross ton, f.o.b. Boston

No. 1 heavy, melting		$34.40
No. 2 hvy, melting		34.40
Nos. 1 and 2 bundles		34.40
Busheling		34.40
Shoveling turn.		31.40
Machine shop turn.		29.40
Mixed bor. and turn.		29.40
Cl'n cast chem. bor.	33.00 to	34.50
No. 1 machinery cast	59.00 to	60.00
No. 2 machinery cast	56.00 to	57.00
Heavy breakable cast	53.50 to	54.50
Stove plate	51.00 to	51.50

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	....	$38.00
No. 2 hvy. melting	....	38.00
No. 1 bundles	....	38.00
New busheling	....	38.00
Flashings	....	38.00
Mach. shop turn.	$32.50 to	33.00
Shoveling turn.	34.50 to	35.00
Cast iron borings	33.50 to	34.00
Mixed bor. & turn.	34.50 to	35.00
Low phos. plate	42.50 to	43.00
No. 1 cupola cast	55.00 to	58.00
Heavy breakable cast	50.00 to	58.00
Stove plate	52.00 to	58.00
Automotive cast	55.00 to	58.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$44.50 to	$45.50
No. 2 hvy. melting	41.00 to	41.50
No. 1 bundles	44.50 to	45.50
No. 2 bundles	41.00 to	41.50
Mach. shop turn.	36.50 to	37.50
Shoveling turn.	38.00 to	38.50
Mixed bor. and turn.	36.50 to	37.50
Clean cast chemical bor	41.50 to	42.00
No. 1 machinery cast	65.00 to	66.00
No. 1 mixed yard cast	60.00 to	62.00
Hvy. breakable cast	62.00 to	63.00
Clean auto cast	65.00 to	66.00
Hvy. axle forge turn.	46.50 to	47.50
Low phos. plate	49.50 to	50.50
Low phos. punchings	49.50 to	50.50
Low phos. bundles	47.00 to	48.00
RR. steel wheels	53.00 to	54.00
RR. coil springs	53.00 to	54.00
RR. malleable	75.00 to	78.00
Cast iron carwheels	68.00 to	70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy, melting	$43.00 to	$44.00
No. 2 hvy. melting	40.00 to	41.00
Bundled sheets	40.00 to	41.00
Mach. shop turn.	35.00 to	36.00
Locomotive tires, uncut	50.00 to	51.00
Mis. std. sec. rails	52.00 to	54.00
Steel angle bars	54.00 to	55.00
Rails 3 ft and under	58.00 to	60.00
RR. steel springs	51.00 to	52.00
Steel car axles	56.00 to	57.00
Grate bars	59.00 to	60.00
Brake shoes	57.00 to	58.00
Malleable	72.00 to	73.00
Cast iron car wheels	61.00 to	62.00
No. 1 machinery cast	65.00 to	67.00
Hvy. breakable cast	59.00 to	60.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	....	$40.00
No. 2 hvy. melting	....	40.00
No. 2 bundles	....	40.00
No. 1 busheling	....	40.00
Long turnings	27.50 to	28.50
Shoveling turnings	29.50 to	30.50
Cast iron borings	....	....
Bar crops and plate	44.00 to	45.00
Structural and plate	44.00 to	45.00
No. 1 cupola cast.	64.00 to	67.00
Stove plate	63.00 to	64.00
No. 1 RR. hvy, melt	....	41.00
Steel axles	51.00 to	52.00
Scrap rails	44.00 to	45.00
Rerolling rails	55.00 to	57.00
Angles & splice bars	51.00 to	53.00
Rails 3 ft & under	52.00 to	55.00
Cast iron carwheels	50.00 to	55.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.50 to	$43.00
No. 2 hvy. melting	42.50 to	43.00
Mach. shop turn.	37.50 to	38.00
Short shov. turn.	39.50 to	40.00
Cast iron borings	38.50 to	39.00
Low phos.	47.50 to	48.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy, melting	$38.50 to	$39.00
No. 2 hvy. melting	....	37.00
No. 2 bundles	....	37.00
Mach. shop turn.	31.50 to	32.00
Mixed bor .& turn.	31.50 to	32.00
Shoveling turnings	33.50 to	34.00
No. 1 cupola cast	57.50 to	58.50
Clean auto cast	57.50 to	58.50
Hvy. breakable cast	56.00 to	57.00
Charging box cast	56.00 to	57.00
Unstrp motor blks	55.00 to	56.00
Cl'n cast chem. bor	34.50 to	35.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$45.00 to	47
No. 2 heavy, melting	41.75 to	42
No. 1 bundles	41.75 to	42
No. 2 bundles	41.75 to	42
No. 1 busheling	41.75 to	42
Mach. shop turn.	36.75 to	37
Shoveling turn.	38.75 to	39
Cast iron borings	37.75 to	38
Mixed bor. and turn.	36.75 to	37
Clean auto cast.	63.00 to	64
Mixed cupola cast	63.00 to	64
Charging box cast	59.00 to	60
Stove plate	62.00 to	63
Stove auto cast	60.00 to	61
RR. malleable	70.00 to	75
Small indi. malleable	47.00 to	49
Low phos, plate	47.25 to	48
Scrap rails	50.00 to	52
Rails 3 ft & under	57.00 to	58
RR steel wheels	51.00 to	52
Cast iron carwheels	51.00 to	52
RR. coil & leaf spgs	51.00 to	52
RR. knuckles & coup	51.00 to	52

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.00 to	$42
No. 2 hvy. melting	42.00 to	42
No. 1 bundles	42.00 to	42
No. 1 busheling	42.00 to	42
Drop forge flashings	42.00 to	42
Mach. shop turn.	37.00 to	37
Shoveling turn.	38.00 to	38
Steel axle turn.	42.00 to	42
Cast iron borings	38.00 to	38
Mixed bor. & turn.	38.00 to	38
Low phos.	47.00 to	47
No. 1 machinery cast	73.00 to	76
Malleable	82.00 to	83
RR. cast.	76.00 to	77
Railroad grate bars	60.00 to	62.
Stove plate	61.00 to	63.
RR. hvy. melting	42.50 to	43.
Rails 3 ft and under	63.50 to	64.
Rails 18 in. and under	65.00 to	66.

SAN FRANCISCO

Per gross ton f.o.b. shipping point:

No. 1 hvy, melting	....	$27.
No. 2 hvy, melting	....	27.
No. 2 bales	..	27.
No. 3 bales	....	24.
Mach. shop turn.	....	18.
Elec. fur. 1 ft under	36.00 to	40.
No. 1 cupola cast	50.00 to	51.
RR. hvy, melting	....	28.
Rails	....	29.

LOS ANGELES

Per gross ton f.o.b. shipping point:

No. 1 hvy, melting	...	$27.
No. 2 hvy, melting	....	27.
No. 1 bales	....	27.
No. 2 bales	....	27.
No. 3 bales	....	24.
Mach. shop turn.	....	18.
No. 1 cupola cast.	45.00 to	50.
RR. hvy, melting	....	28.

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	....	$26.
Elec furn. 1 ft and under.	....	40.
No. 1 cupola cast	40.00 to	43.
RR. hvy, melting	....	26.

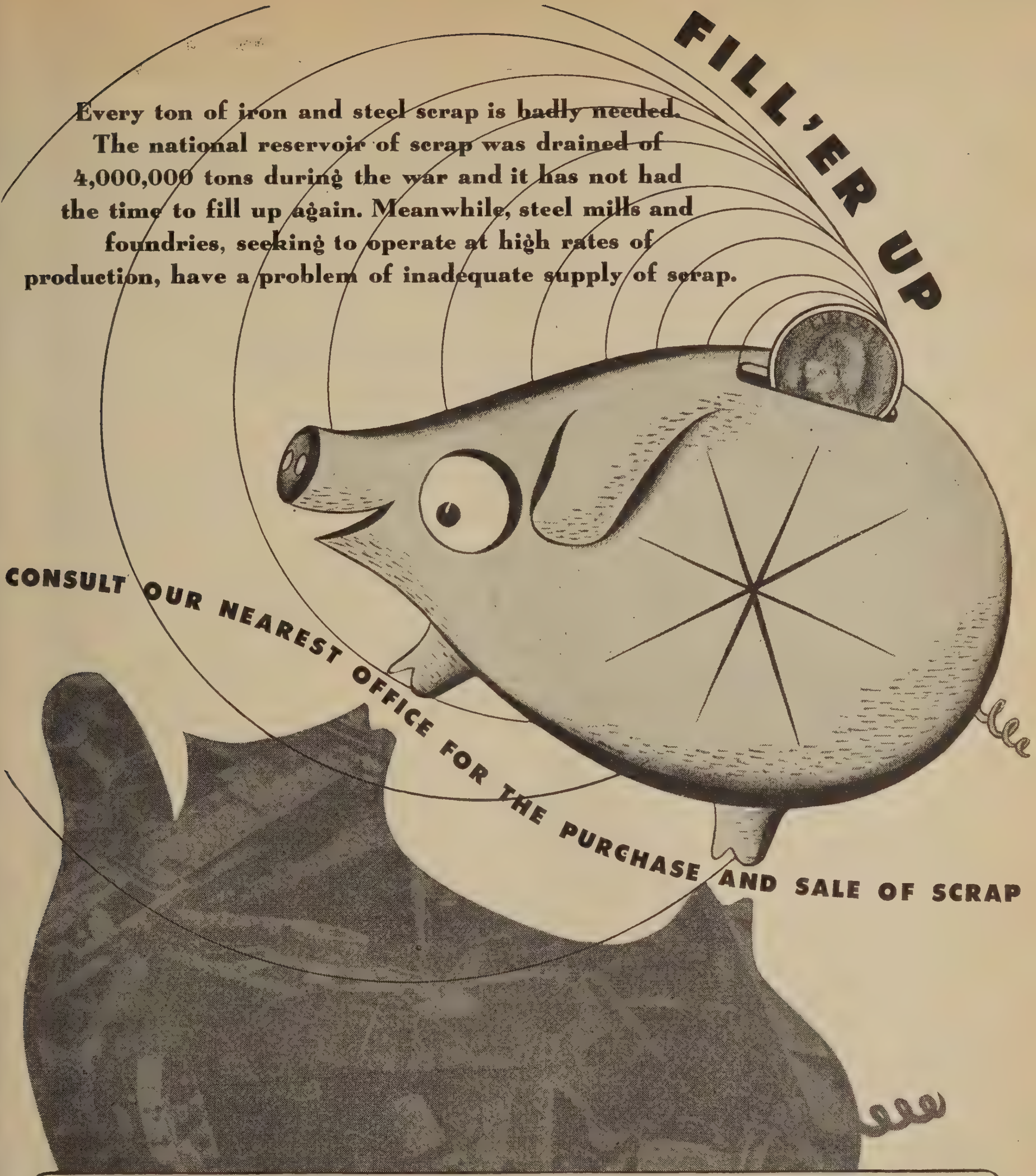
HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point.

Heavy melting		$22.0
No. 1 bundles		22.0
No. 2 bundles		21.5
Mechanical bundles		20.0
Mixed steel scrap		19.0
Mixed borings and turnings		17.0
Rails, remelting		23.0
Rails, rerolling		26.0
Bushelings		17.0
Bushelings, new fact, prop'd		21.0
Bushelings, new fact, unprep'd		16.0
Short steel turnings		17.0
No. 1 cast	42.00 to	46
No. 2 cast	35.00 to	37

*Ceiling Price.

Every ton of iron and steel scrap is badly needed. The national reservoir of scrap was drained of 4,000,000 tons during the war and it has not had the time to fill up again. Meanwhile, steel mills and foundries, seeking to operate at high rates of production, have a problem of inadequate supply of scrap.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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Copper

New York

• • • **The copper market** returned to a uniform price basis last week when the sole seller at the 21.50¢ level opened its books for September on Aug. 11 at the 2¢ higher prevailing market. No orders had been accepted by Kennecott Copper Corp. since Aug. 9 when mill products prices were advanced by its subsidiaries Chase Brass & Copper Co. and Kennecott Wire & Cable Co. in line with action previously taken by all other mills. During the week the American Smelting & Refining Co. advanced its premiums for special copper shapes and billets by 25¢ to $1 a ton.

The threat of a strike at the Utah, New Mexico and Nevada operations of Kennecott was killed when the officers of the International Union of Mine, Mill and Smelter Workers decided to continue their men at work under the provisions of the old contract with the 12¢ an hour wage increase made retroactive to the expiration date of the contract on July 1. The company was unwilling to negotiate a new contract with the union until its officers had signed a non-Communist affidavit as required by the Taft-Hartley Act.

A bill to extend the copper tariff suspension until Mar. 31, 1952 was introduced into the House by Representative James T. Patterson of Connecticut just prior to adjournment. The present tariff suspension period ends on Mar. 31, 1949, when a reduction from 4¢ to 2¢ per lb would go into effect under the Geneva Conference Agreement. Representative Patterson says that 700,000 tons of copper have been imported duty-free since the enactment of his original measure. He intends to reintroduce the 3-year additional suspension bill into the next session of Congress.

The Economic Cooperation Administration has worked out a solution to the problem of establishing the market price of commodities bought in bulk for the European Recovery Program. The enabling act requires that there be no purchases in bulk at prices higher than the prevailing market in the United States at the time they are made. By an amendment to ECA's regulation No. 1, the administrator may make the determination as to an acceptable price in a manner reflecting commonly accepted trade practices. This ruling would seem to permit exports of nonferrous metals at higher world levels when necessary.

Phelps Dodge Corp. announced the purchase from RFC at a total cost of $19 million of war-built added facilities at its Morenci, Ariz. and El Paso, Tex. plants.

•

Lead

New York

• • • **The strike** at the properties of St. Joseph Lead Co. had already cost more than 12,000 tons of lead production last week in a market that was already critically short of the metal. Consumers are desperately seeking supplies and are anxious to buy at premiums well above the market. Some instances have been uncovered in which premiums paid have reached 3¢ and 3½¢ per lb above the 19.50¢ price. Late last week there were no signs of approaching agreement between managemnt and reportedly Communist dominated IUMMSW.

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Ingot Market Quiet

New York

• • • **A summer lull** has appeared in the secondary ingot markets with the closing down of many foundries for vacations. The rece heavy pressure for aluminum i gots has abated but this has n been followed by lower prices far. However there were declin of ½¢ per lb in the prices of a aluminum scrap grades last wee Refineries are reported to be out the market for red metal scrap d largely to the heavy influx of met brought forth by the recent i creases.

Cuban Nickel Plant Is Offered By War Asse

New York

• • • **The nickel mining** and pro essing plant built in Cuba at go ernment expense during the w and operated by the Nicaro Nick Co. is being offered for disposal the War Assets Administratio The government agency desires make disposition of the plant such a way as to permit resum tion of the production of nick oxide for use by the steel industr The rearmament program a stockpiling nickel requirements a such as to tax the present produ tion capacity of the major nick producer, the International Nick Co. of Canada, to the point th civilian consumption has been stricted on a voluntary basis.

The Cuban nickel plant has capacity of 32 million lb of nick per year, and ore reserves es mated at nearly 35 million to However, the Cuban nickel ore is low grade, less than 2 pct nick content, and does not contain a platinum group or other precio metals that are found in Canadi orebodies.

Responsible authorities in Fre port Sulphur Co., parent compa of Nicaro Nickel, and in Intern tional Nickel Co. have stated th they are not giving considerati at this time to the acquisition the Cuban nickel facilities.

Sealed bids are invited by WA for purchase or lease of the pla as a whole for use in the producti of nickel. Proposals will be open in September or October at a da to be announced later. The pla was built at a cost of $32 millio

Nonferrous Metals Prices

	Aug. 11	Aug. 12	Aug. 13	Aug. 14	Aug. 16	Aug. 17
Copper, electro, Conn.	23.50	23.50	23.50	23.50	23.50	23.50
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	$1.03	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	15.00	15.00	15.00	15.00	15.00	15.00
Lead, St. Louis	19.30	19.30	19.30	19.30	19.30	19.30

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	16.00 to 17.00
Aluminum pig	1500 to 16.00
Antimony, American, Laredo, Tex.	35.00
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$20.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$40.00
Cadmium, del'd	$1.90
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	23.50
Copper, lake, Conn. Valley	23.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per try oz.	$110 to $120
Lead, St. Louis	19.30
Lead, New York	19.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$76 to $78
Nickel, electro, f.o.b. New York	42.90
Palladium, dollars per troy oz.	$24 00
Platinum, dollars per troy oz.	$93 to $96
Silver, New York, cents per oz.	74.625
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	15.00
Zinc, New York	15.65
Zirconium copper, 20 pct Zr, per lb contained Zr.	$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	21.00-22.00
No. 120	20.50-21.50
No. 123	20.00-21.00
80-10-10 ingot	
No. 305	27.25
No. 315	24.25
88-10-2 ingot	
No. 210	33.00
No. 215	31.00
No. 245	24.75-25.75
Yellow ingot	
No. 405	16.25-17.50
Manganese bronze	
No. 421	23.00

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	**26.50–27.50**
0.60 copper, max.	**26.50–27.00**
Piston alloys (No. 122 type)	**24.25–24.75**
No. 12 alum. (No. 2 grade)	**23.50–24.00**
08 alloy	23.50–24.25
95 alloy	23.50–24.50
3 alloy	26.00–27.00
AXS-679	24.00–24.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct.-95½ pct.	**24.50–25.50**
Grade 2—92 pct–95 pct.	**24.00–25.00**
Grade 3—90 pct–92 pct.	**23.00–24.00**
Grade 4—85 pct–90 pct.	**23.50–24.00**

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, ft. allowed	
Cast, oval, 15 in. or longer	40⅛
Electrodeposited	34⅜
Rolled, oval, straight, delivered	37.34
Rolled, oval, 18 in. or longer	35⅜
Ball anodes	30⅜
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	35⅞
Zinc, cast, 99.99	20.50
Nickel 99 pct plus, frt. allowed	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.00
Silver 999 fine	
Rolled, 100 oz lots per troy oz.	67¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46.00
Copper sulfate, 99.5, crystals, bbls.	**12.50**
Nickel salts, single or double, 425 lb bbls. frt. allowed	18.00
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	**54.00**
Sodium cyanide, 96 pct domestic. 100 lb drums	16.00
Zinc cyanide, 10 lb drums	37.00
Zinc sulfate, 89 pct, granules, bbls, frt. allowed	7.90

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb., f.o.b. shipping point, freight allowed.)

Flat Sheet: 0.188 in., 2S, 3S, 25.7¢; 4S, 61S-O, 27.8¢; 52S, 29.9¢;24S-O, 24S-OAL, 28.8¢; 75S-O, 75S-OAL, 35.3¢. 0.081 in., 2S, 3S, 26.8¢; 4S, 61S-O, 29.2¢; 52S, 31.3¢; 24S-O, 24S-OAL, 29.9¢; 75S-O, 75S-OAL, 37.0¢. 0.032 in., 2S, 3S, 28.5¢; 4S, 61S-O, 32.5¢; 52S, 35.2¢; 24S-O, 24S-OAL, 36.9¢; 75S-O, 75S-OAL, 46.6¢.

Plate: ¼ in. and heavier; 2S, 3S, 22.8¢; 4S-F, 25.0¢; 52S, 26.1¢; 61S-O, 25.6¢; 24S-F, 24S-FAL, 26.1¢; 75S, 75S-AL, 32.9¢.

Extruded Solid Shapes: Shape factors 1 to 4; 31¢ to 59¢; 11 to 13, 31.9¢ to 69c; 23 to 25, 33.4c to 90¢; 35 to 37, 40.8¢ to $1.25; 47 to 49, 58.7¢ to $1.84.

Extruded Round Rod, Square, Hex, Octagonal Bar: ¼ in. and over, 27¢ to 38¢; ½ to ¾ in., 28¢ to 40.5¢; ⅜ to ½ in., 29c to 43c; ¼ to ⅜ in., 30¢ to 46.5¢; $\frac{3}{16}$ to $\frac{7}{32}$ in., 32.5¢ to 53.5¢; 9/64 to $\frac{5}{32}$ in., 35.5¢ to 62¢.

Rolled Rod: 1.064 to 4.5 in., 2S, 3S, 33¢ to 29.5¢; Cold-finished rod, 0.375 to 3.5 in., 2S, 3S, 35.5¢ to 31¢.

Screw Machine Stock: Drawn, ⅛ to $\frac{11}{32}$ in., 11S-T3, R317-T4, 48¢ to 34¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 34.5¢; ⅜ to 2 in., R317-T4, 33¢ to 30¢; rolled, $1\frac{9}{16}$ to 3 in., 11S-T3, 34.5¢ to 31.5¢; 2⅛ to 3⅜ in., R317-T4, 29.5¢ to 28.5¢. Base 5000 lb.

Drawn Wire: coiled, 0.051 to 0.374 in.; 2S, 35¢ to 25.5¢; 52S, 43c to 31c; 56S, 45.5c to 37¢; 17S-T4, 49¢ to 33.5¢; 61S-T4, 43.5c to 33c.; 75S-T6, 75¢ to 54¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58c-60c; 10, 59c-61c; 12, 63-65c; 14, 69c-74c; 16, 76c-81c; 18, 84c-89c 20, 96c-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢ 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to $\frac{5}{16}$ $1.14; $\frac{5}{16}$ to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, ⅜ to $\frac{7}{16}$, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks		40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78	....	37.18
Copper, hot-rolled	....	33.28	....
Copper, drawn	....	34.28	....
Low brass	38.07*	34.85	35.16
Yellow brass	36.76*	33.44	33.75
Red brass	38.55*	35.33	35.64
Naval brass	33.92	32.67	38.61
Leaded brass	....	28.30	....
Commercial bronze	39.29*	36.32	36.63
Manganese bronze	37.51	36.01	42.11
Phosphor bronze, 5 pct	57.80*	56.30	56.05
Muntz metal	33.47	32.22	36.66
Everdur, Herculoy, Olympic, etc.	40.43	40.67	41.73
Nickel silver, 10 pct	....	46.42	44.20
Architectural bronze	....	....	32.33

* Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Cents per pound; add 1¢ per lb for shipments of 15,000 lb or more.)

	Heavy	Turnings
Copper	21⅛	20⅜
Yellow brass	18	17⅛
Red brass	19¾	19
Commercial bronze	19¾	19
Manganese bronze	17¾	16⅞
Leaded brass rod ends	17¾	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1 copper wire	20.25-20.50
No. 2 copper wire	19.25
Light copper	18.25
Refinery brass	18 00-18.25*

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.

No. 1 copper, wire	19.25
No. 2 copper, wire	18.25
Light copper	17.25
No. 1 composition	16.50
No. 1 comp. turnings	16.25
Rolled brass	12.75
Brass pipe	12.50
Radiators	13.75
Heavy yellow brass	12.00
Aluminum	
Mixed old cast	11.50
Mixed old clips	11.50
Mixed turnings, dry	11.00
Pots and pans	12.00
Low copper	12.50

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Copper and Brass

No. 1 heavy copper and wire	18 —18¼
No. 2 heavy copper and wire	17 —17¼
Light copper	16 —16½
Auto radiators (unsweated)	11¼ —11¾
No. 1 composition	13¾ —14
No. 1 composition turnings	13¼ —13½
Clean red car boxes	10¼ —10½
Cocks and faucets	10¼ —10½
Mixed heavy yellow brass	8¾ — 9¼
Old rolled brass	10¼ —10½
Brass pipe	10¾ —11
New soft brass clippings	13¼ —14
Brass rod ends	11 —11½
No. 1 brass rod turnings	10¼ —10¾

Aluminum

Alum. pistons and struts	8 — 8½
Aluminum crankcases	10½—11
2S aluminum clippings	12 —12½
Old sheet & utensils	10½—11
Borings and turnings	5 — 5½
Misc. cast aluminum	10½—11
Dural clips (24S)	10½—11

Zinc

New zinc clippings	10 —10½
Old zinc	7¾ — 8¼
Zinc routings	**4 — 4½**
Old die cast scrap	4½— 5

Nickel and Monel

Pure nickel clippings	19 — 20
Clean nickel turnings	15 — 16
Nickel anodes	18 — 19
Nickel rod ends	19 — 20
New Monel clippings	14 — 15
Clean Monel turnings	10 — 11
Old sheet Monel	12 — 12½
Old Monel castings	10 — 11
Inconel clippings	10 — 11
Nickel silver clippings, mixed	8 — 8½
Nickel silver turnings, mixed	6½ — 7

Lead

Soft scrap lead	17 —17½
Battery plates (dry)	11 —11½

Magnesium Alloys

Segregated solids	**8 — 9**
Castings	**4½— 5½**

Miscellaneous

Block tin	81 —83
No. 1 pewter	65 —67
No. 1 auto babbitt	51 — 53
Mixed common babbitt	14¾ — 15¼
Solder joints	19¾ — 20¼
Siphon tops	50 —52
Small foundry type	20 —20½
Monotype	19 —19½
Lino. and stereotype	18 —18½
Electrotype	16½—17
New type shell cuttings	15 —15½
Hand picked type shells	6½— 7
Lino and stereo dross	9½—10
Electro dress	6½— 7

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Aug. 17, 1948	Aug. 10, 1948	July 20, 1948	Aug. 19, 1947
Hot-rolled sheets	3.26	3.26	2.775	2.80
Cold-rolled sheets	4.00	4.00	3.495	3.55
Galvanized sheets (10 ga)	4.40	4.40	3.913	3.95
Hot-rolled strip	3.265	3.265	2.775	2.80
Cold-rolled strip	4.063	4.063	3.535	3.55
Plates	3.425	3.425	2.93	2.95
Plates wrought iron.....	7.85	7.85	7.25	6.85
Stain's C-R strip (No. 302)	33.25	33.25	30.50	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes..	$6.80	$6.80	$6.70	$5.75
Tinplate, electro (0.50 lb)	6.00	6.00	5.90	5.05
Special coated mfg. ternes	5.90	5.90	5.80	4.90
Bars and Shapes: (cents per pound)				
Merchant bars	3.37	3.37	2.875	2.90
Cold-finished bars	3.995	3.995	3.483	3.55
Alloy bars	3.75	3.75	3.213	3.30
Structural shapes	3.25	3.25	2.767	2.80
Stainless bars (No. 302)	28.25	28.25	26.00	26.00
Wrought iron bars	9.50	9.50	8.65	7.15
Wire: (cents per pound)				
Bright wire	4.344	4.344	3.608	3.55
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$2.725	$2.75
Light rails	3.55	3.55	3.05	3.10
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$45.00	$45.00†
Slabs, rerolling	52.00	52.00	45.00	45.00†
Forging billets	61.00	61.00	54.00	55.00†
Alloy blooms, billets, slabs	63.00	63.00	66.00†	66.00†
Wire Rods and Skelp: (cents per pound)				
Wire rods	3.619	3.619	3.133	2.80
Skelp	3.25	3.25	2.888	2.60

† Gross ton

Pig Iron: (per gross ton)	Aug. 17, 1948	Aug. 10, 1948	July 20, 1948	Aug. 19, 1947
No. 2, foundry, Phila.....	$49.26	$49.26*	$44.74	$41.22
No. 2, Valley furnace...	43.50	43.50	43.50	36.50
No. 2, Southern Cinti....	48.14	48.14	45.47	38.25
No. 2, Birmingham......	43.38	48.14	48.14	36.50
No. 2, foundry, Chiago†.	43.00	43.38	42.05	34.88
Basic del'd Philadelphia..	48.76	48.76*	44.24	40.72
Basic, Valley furnace....	43.00	43.00	43.00	36.00
Malleable, Chicago†	43.50	43.50	43.50	36.50
Malleable, Valley	43.50	43.50	43.50	36.50
Charcoal, Chicago	69.55	69.55*	69.55*	49.49
Ferromanganese‡	145.00	145.00	145.00	135.00

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† The switching charge for delivery to foundries in the Chicago district is $1 per ton.

‡ For carlots at seaboard.

* Revised

Scrap: (per gross ton)	Aug. 17, 1948	Aug. 10, 1948	July 20, 1948	Aug. 19, 1947
Heavy melt'g steel, P'gh.	$42.75	$42.75	$40.25	$38.00
Heavy mlt'g steel, Phila.	45.00	45.00	42.50	37.00
Heavy melt'g steel, Ch'go	41.75	41.75	41.25	38.75
No. 1, hy, comp, sh't, Det.	38.00	38.00	38.25	34.50
Low phos. Young'n......	47.75	47.75	45.25	44.50
No. 1, cast, Pittsburgh..	65.00	65.00	63.75	42.50
No. 1, cast, Philadelphia.	65.50	65.50	65.50	47.00
No. 1, cast, Chicago.....	74.50	74.00	73.00	47.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke prompt....	$13.50	$13.50	$13.75	$12.00
Foundry coke, prompt...	17.00	17.00	16.50	13.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro. Conn....	23.50	23.215	21.50	21.50
Copper, Lake Conn......	23.625	23.625	21.625	21.625
Tin, Grade A, New York.	$1.03	$1.03	$1.03	80.00
Zinc, East St. Louis....	15.00	15.00	12.00	10.50
Lead, St. Louis.........	19.30	19.30	17.30	14.80
Aluminum, virgin	16.00	16.00	16.00	15.00
Nickel, electrolytic	42.90	42.90	36.56	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex..	35.00	35.00	35.00	33.00

Composite Prices . .

The figures for the second quarter 1948 have been revised to conform with actual second quarter shipments. Shipment data by American Iron & Steel Institute. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
Aug. 17, 1948.......	3.75833¢ per lb...........	....$44.52 per gross ton....	......$43.16 per gross ton......
One week ago.......	3.75833¢ per lb...........	....$44.11 per gross ton....	......$43.16 per gross ton......
One month ago......	3.25116¢ per lb...........	....$42.96 per gross ton....	......$41.33 per gross ton......
One year ago.......	3.19141¢ per lb...........	....$37.35 per gross ton....	......$37.92 per gross ton......

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1948....	3.75902¢ July 27	3.22566¢ Jan. 1	$44.52 Aug. 17	$39.58 Jan. 6	$43.16 July 27	$39.75 Mar. 9
1947....	3.19541¢ Oct. 7	2.87118¢ Jan. 7	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946....	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945....	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944....	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943....	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942....	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941....	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940....	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939....	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938....	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937....	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936....	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935....	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934....	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933....	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932....	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931....	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930....	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929....	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13 San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only. (18) Fontana prices omitted from this issue.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas.														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		[18] Seattle, S. Fr'isco, Los Angeles	Detroit	Johnstown	
INGOTS Carbon forging	$50.00														
Alloy	$51.00						(per net ton)								
BILLETS, BLOOMS, SLABS Carbon, rerolling[12]	$52.00				$52.00	$52.00	(per net ton)							$52.00	
Carbon forging billets	$61.00	$61.00	$61.00	61.00	$61.00	$61.00	(per net ton)							$61.00	
Alloy	$63.00	$63.00				63 .00	(Bethlehem, Canton, Massillon = $63.00) (per net ton)								
PIPE SKELP	3.25						3.25				Warren =3.25				
WIRE RODS	3.40 to 4.15	3.40 to 3.90		3.40	3.40		3.65	3.40			Worcester 3.70	4.05[13] 4.10[14]		3.40	
SHEETS Hot-rolled[6]	3.25 to 3.30	3.25	3.25	3.25-3.30	3.25	3.25	3.25	3.25		Warren, Ashland = 3.25		3.95[15]	3.45		
Cold-rolled[1]	4.00	4.00 to 4.25	4.00	4.00	4.00	4.00	4.00	4.00	4.20	4.00	Warren 4.00		4.20		
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton = 4.40	4.40	Ashland =4.40	5.15[15]			
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40			4.70		
Long ternes[2] (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled[3]	3.25 to 3.30	3.25 to 3.30	3.25	3.25 3.30	3.25	3.25	3.25	3.25		3.25	Warren =3.25	4.00 to 4.25[15]	3.45		
Cold-rolled[4]	4.00	4.25		4.00	4.00	4.00	4.00	4.00		New Haven 4.00 Warren = 4.00 to 4.25			4.20 to 4.50		
TINPLATE Cokes, 1.50 lb,[5] base box	6.80	6.80	6.80		6.90			6.90	6.90	(Warren, Ohio = $6.80)					
Electrolytic 0.25, 0.50, 0.75 lb, box	Deduct $1.00, 80¢ and 60¢ respectively from 1.50 lb coke base box price														
TERNES, MFG., special coated	Deduct 90¢ from 1.50 lb coke base box price.														
BLACKPLATE, CANMAKING 55-70 lb, 75-95 lb, 100-128 lb	Deduct $1.60, $1.70 and $1.60 respectively from 1.50 lb coke base box price.														
BLACKPLATE, h.e., 29 ga.[10]	4.75	4.75	4.75				[illegible]	4.85							
BARS Carbon Steel	3.35 to 3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton = 3.35	4.05 to 4.10		3.35	
Reinforcing (billet)[7]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton = 3.35	4.05 to 4.10		3.35	
Cold-finished[8]	3.95 to 4.00	4.00	4.00	4.00			4.00						4.30		
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon = 3.75				4.80[11]		3.75	
Alloy, cold-drawn								Massillon= 4.65							
PLATE Carbon steel[11]	3.40 to 3.60	3.40	3.40	3.40	3.40	3.45	3.40	Coatesville = 3.75, Claymont = 3.95 Geneva, Utah = 3.40, Harrisburg—5.85					3.65	3.45	
Floor plates	4.55	4.55		4.55											
Alloy	4.40	4.40							Coatesville = 5.10						
SHAPES, Structural	3.25	3.25	3.25		3.25	3.30	Bethlehem = 3.30, Geneva, Utah = 3.25					3.85 to 4.30		3.30	
MANUFACTURERS' WIRE[9] Bright	4.15 to 4.50	4.15 to 4.65		4.15	4.15		4.50	4.25	Duluth, Worcester = 4.15			5.10[13]		4.15	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester = 5.50 New Haven, Trenton = 5.50			Duluth= 5.20-6.15		5.20	
PILING, Steel sheet	4.05	4.05				4.05									

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. producing point

	Chromium Nickel		Straight Chromium			
Product	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Billets, forging	25.25—27.75	24.75—24.50	19.25—21.50	19.25—21.75	23.00	28.00—30.25
Bars, hot-rolled	29.25—30.00	28.50	22.50—23.00	23.00—23.50	27.00	33.00—32.50
Bars, cold-finished	29.25—30.00	28.50	22.50—23.00	23.00—23.50	27.00	33.00—32.50
Plates	34.75—34.00	32.50—32.00	25.75—26.00	26.50	30.75	36.25—35.50
Shapes, structural	29.25—30.00	28.50	22.50—23.00	23.00—23.50	27.00	33.00—32.50
Sheets	43.00—39.50	40.75—37.50	32.00—33.00	34.75—35.50	39.00	43.50—50.00
Strip, hot-rolled	28.00—27.75	25.75	20.25—21.25	21.00—21.75	28.50	41.75—45.00
Strip, cold-rolled	35.75—35.00	33.50—33.00	26.50—27.00	27.00—27.50	38.50	62.25—60.00
Wire, cold-drawn	29.25—30.00	28.50	22.50—23.00	23.00—23.50	27.00	33.00—32.50
Wire, flat, cold-rolled	35.75	33.25	26.25	26.75	38.25	62.00
Rod, hot-rolled	29.75	28.50	22.00	22.50	26.75	31.75
Tubing, seamless	79.25	79.25	....	75.25	....	....

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	14.00¢
8 to 16	48, 60, 72	14.50¢
7	48, 60	15.75¢
6	48, 60	17.00¢
4, 5	40	17.50¢
3	40	18.50¢
2½	24, 30	19.00¢
2	24, 30	21.00¢
Carbon		
40	100, 110	6.75¢
35	65, 110	6.75¢
30	65, 84, 110	6.75¢
24	72 to 104	6.75¢
17 to 20	84, 90	6.75¢
14	60, 72	7.25¢
10, 12	60	7.50¢
8	60	7.75¢

TOOL STEEL

F.o.b. mill

W	Cr.	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢
High-carbon-chromium					52¢
Oil harden manganese					29¢
Special carbon					26.5¢
Extra carbon					22¢
Regular carbon					19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95 to 6.15
Motor	6.90 to 7.20
Dynamo	7.50 to 7.90
Transformer 72	8.05 to 8.90
Transformer 65	8.60 to 9.60
Transformer 58	9.30 to 10.30
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 O.H., per 100 lb	$3.20
Joint bars, 100 lb	4.25
Light rails (from billets) per 100 lb	3.55

	Base per lb
Cut spikes	5.35¢
Screw spikes	8.00¢
Tie plate, steel	4.05¢
Tie plates, Pittsburg, Calif.*	4.20¢
Track bolts	7.50¢
Track bolts, heat treated, to railroads	8.50¢

*Seattle, add 30¢.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.00¢
0.41 to 0.60 carbon	5.50¢
0.61 to 0.80 carbon	6.10¢
0.81 to 1.05 carbon	8.05¢
1.06 to 1.35 carbon	10.35¢

Worcester, add 0.30¢

CLAD STEEL

Base princes, cents per pound

	Plate	Sheet
Stainless-clad No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad 10 pct f.o.b. Coatesville, Pa.	21.50	
Inconel-clad 10 pct, f.o.b. Coatesville	30.00	
Monel-clad 10 pct, f.o.b. Coatesville	24.00	
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	....	7.75

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* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	*Pittsburg Calif.*
Standard & coated nails*	103	123
Galvanized nails*	103	123
Woven wire fence†	109	132
Fence posts, carloads††	114	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

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* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	*Pittsburg Calif.*
Annealed fence wire‡	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡	6.75	...

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt. (less 20¢ to jobbers).

HIGH STRENGTH, LOW ALLOY STEELS

mill prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayari R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	5.20	5.20	5.20	5.30	5.20	5.20	5.20	5.20	5.65
Sheets									
Hot-rolled	4.95	4.95	4.95	5.25	4.95	4.95	4.95	4.95	5.25
Cold-rolled	6.05	6.05	6.05	....	6.05	6.05	6.05	6.05	6.35
Galvanized	..	6.75		....	....	6.75	....	....	....
Strip									
Hot-rolled	4.95	4.95	4.95	....	4.95	4.95	4.95	4.95	5.25
Cold-rolled	....	....	6.05	....	....	6.05	6.05		6.35
Shapes	....	4.95	....	....	4.95	4.95	4.95		....
Beams	....	4.95	....	....		....	....	....	....
Bars									
Hot-rolled	5.10	5.10	5.10	....	5.10	5.10	5.10		5.40
Bar shapes	....	5.10	....	....	5.10	5.10	5.10		

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts, f.o.b. mills, steel buttweld and seamless. Base price, $200.00 per net ton.

tandard, threaded and coupled

teel, buttweld	*Black*	*Galv.*
-in	46	29½
-in.	48½	32½
¼-in.	49	33
-in.	49½	33½
-in.	50	34
½ and 3-in.	50½	34½
rought Iron, buttweld		
-in.	+20½	+46
-in	+10½	+35
and 1¼-in	+ 4½	+26
in.	— 1½	+22½
-in.	— 2	+22
teel, lapweld		
-in.	39½	23
½ and 3-in.	43½	27
½ to 6-in.	45½	29
teel, seamless		
-in.	38½	22
½ adn 3-in.	41½	25
½ to 6-in.	43½	27
rought Iron, lapweld		
-in.	+ 7½	+30
½ to 3½-in.	+ 5	+25½
in.	list	+19½
½ to 8-in.	+ 2	+21

xtra Strong, plain ends

eel, buttweld		
-in.	41	25
-in.	45	29
in.	47	32
¼-in.	47½	32½
½-in.	48	33
in.	48½	33½
½ and 3-in.	49	34
rought Iron, buttweld		
-in	+16	+40
-in.	+ 9½	+33
to 2 in.	— 1½	+22
eel, lapweld		
in.	38½	23
½ and 3-in.	43½	28
½ to 6-in.	45½	29
eel, seamless		
in.	37½	22
½ and 3-in.	41½	26
½ and 6-in.	45	29½
rought Iron, lapweld		
in.	+ 4½	+26½
2 to 4-in.	— 5	+15
½ to 6-in.	— 1	+19½

Basing discounts for standard pipe are r threads and couplings. For threads ly, buttweld, lapweld and seamless pe, one point higher discount (lower ice) applies. For plain ends, buttweld, pweld and seamless pipe 3-in. and naller, three points higher discount ɔwer price) applies, while for lapweld ıd seamless 3½-in. and larger four ints higher discount (lower price) ap-ies. F.o.b. Gary prices are one point wer discount on all buttweld. On butt-eld and lapweld steel pipe, jobbers are anted a discount of 5 pct. On l.c.l. ipments, prices are determined by add-g 25 pct and 30 pct and the carload eight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commer-l boiler tubes and locomotive tubes, minimum ll. Prices per 100 ft. at mill in carload lots, length 4 to 24 ft. inclusive.

D	Gage	Seamless		Electric Weld	
in.	BWG	H.R.	C.R.	H.R.	C.D.
2	13	19.18	22.56	18.60	21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

	Per net ton
to 24-in., del'd Chicago	$106.70
o 24-in., del'd N. Y.	103.50 to 108.40
to 24-in., Birmingham	93.50
n. and larger, f.o.b. cars, San Francisco, Los Angeles, for all ail shipment; rail and water shipment less	120.30

Class "A" and gas pipe, $5 extra; 4-in. e is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Percent Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	61.75
In bulk	70.00

Large Rivets	*(½ in. and larger)* *Base per 100 lb*
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets	*(7/16 in. and smaller)* *Percent Off List*
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages)	*Percent Off List*
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Set screws, oval points	
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF, Content:	*Base price per short ton*
70% or more	$35.00
65% but less than 70%	34.00
60% but less than 65%	33.00
Less than 60%	32.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$6.60
Old range, nonbessemer	6.45
Mesabi, bessemer	6.35
Mesabi, nonbessemer	6.20
High phosphorus	6.20

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

METAL POWDER

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe	9.5¢ to 16.0¢
Electrolytic iron, annealed, 99.5+% Fe	19.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe.	44.0¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, minus 300 mesh, 98%, 99.8+% Fe	90.0¢ to $1.75
Aluminum	24.00¢
Antimony	47.67¢
Brass	27.25 to 37.25¢
Copper, electrolytic	33.625¢
Copper, reduced	33.75¢
Cadmium	$2.55
Chromium, electrolytic, 99% min.	$3.50
Lead	26.00¢
Manganese	50.0¢
Molybdenum, 99%	$2.65
Nickel, unannealed	67.00¢
Nickel, spherical, minus 30 Mesh, unannealed	61.00¢
Silicon	29.0¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.0¢
Tin	$1.15
Tungsten, 95%, 99%	$2.90

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$12.50 to $14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$16.00 to $18.00
Foundry, Byproduct	
Chicago, del'd	$23.90
Chicago, f.o.b.	20.85
Detroit, f.o.b.	19.40
New England, del'd	22.75
Seaboard, N. J., f.o.b.	21.50
Philadelphia, f.o.b.	20.55
Swedeland, Pa., f.o.b.	20.50
Ashland, Ohio, f.o.b.	18.25
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	19.95
Cleveland, del'd	22.45
Cincinnati, del'd	21.40
St. Louis, del'd	20.98
Birmingham, del'd	17.86

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	*Carloads, Per* 1000
First quality, Pa., Md., Ky., Mo. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	$14.75 to 15.00
Silica cement, net ton, bulk, Utah and Calif.	21.00

Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Chester	$69.00

Magnesite Brick

Standard, Balt., and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00

Grain Magnesite

Std. ⅜-in. grains

Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, pet net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢	$11.85

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, per 100 lb.
(Metropolitan area delivery, add 15¢ to base, except New York, add 20¢)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS		
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled
Philadelphia	$5.15-5.35	$6.31-6.51	$7.27-7.47	$5.35-5.66	....	$5.37-5.50	$5.09	$5.35-5.42	$6.16	$9.14	$9.29	$10.54
New York	5.40-5.98	6.28[1]-6.43[1]	7.25-7.54	5.58-5.88	6.73	5.78	5.32-5.58	5.53-5.63	6.18-6.38	9.17-9.53	9.32-9.68	10.40-10.77
Boston	5.48-5.64	6.39	7.58-7.69	5.54-5.89	6.75-6.79	5.74	5.39-5.54	5.48-5.59	6.24-6.34	9.40-9.44	9.55-9.59	10.84-10.94
Baltimore	5.28	6.18	7.15-7.38	5.34	....	5.53	5.33	5.39	6.13	....	....	.....
Chicago	4.85	5.75	6.95-7.05	4.85	6.15	5.10	4.90	4.90	5.70	9.00	9.15	10.40
Milwaukee	5.02-5.07	5.92	7.12-7.22	5.02-5.37	6.32	5.22-5.27	5.07	5.07	5.87	9.15-9.17	9.32	10.52-10.57
Cleveland	4.98-5.20	5.75[1]-6.04[1]	7.18-7.24	5.02-5.65	6.70	5.35-5.54	5.16-5.42	5.15-5.34	5.70-5.95	9.14-9.29	9.29-9.79	10.54 .....
Buffalo	4.85-5.10	5 75-5.85	7.60-7.70	5.55-5.56	6.35	5.45-5.46	5.10	5.15-5.20	5.90-6.05	9.05-9.35	9.40-9.50	10.75
Detroit	5.20-5.25	6.15-6.20	7.45	5.25-5.45	6.25-6.55	5.50-5.55	5.30-5.37	5.30-5.52	6.02-6.07	9.31-9.55	9.20-9.47	10.72-10.95
Cincinnati	5.14-5.36[8]	5.82-6.21[8]	6.97-7.45	5.25-5.62[8]	....	5.50-5.71[8]	5.30-5.47[8]	5.30-5.62[8]	6.06-6.17[8]	9.35	9.50-9.51	10.75-10.76
St. Louis	5.19	6.04-6 09	7.29-7.39	5.19-5.79	6.49	5.39-5.44	5.24	5.24	6.04	9.34	9.49	10.74
Pittsburgh	4.35-4.90	5.75[1]	6.95-7.05	5.00-5.35	5.95	5.05-5.25	4.90-5.15	4.90-5.10	5.65-5.80	9.00	9.15	10.40
St. Paul	5.41	6.31	7.30-7.61	5·41	....	5.66	5.46	5.46	6.26	9.56	9.71	10.96
Omaha	5.92	....	9.18	5.92	....	6.17	5.97	5.97	6.77	....	....	....
Birmingham	5.05[11]	6.36	6.45	5.05[11]	6.36	5.25[11]	5.00[11]	5.00[11]	6.51	....	....	.....
Houston	6.40	....	8.80	6.75	....	6.35	6.20	6.40	7.60	9.80	9.65	10.75
Los Angeles	6.30-6.40	7.85[1]-7.90	7.95-8.55	6.60-6.66	9.35[5]	5.95-6.10	5.75-5.90	6.05	7.85[15]-7.95	10.35[15]	10.20[15]	11.75[15]
San Francisco	5.95[8]	7.15	7.65	6.40[8]	....	6.30	5.90	5.90	7.55	10.35[15]	10.20[15]	11.75[15]
Seattle	6.20[4]-6.30[4]	7.75[2]-7.85[2]	7.65 8.00	6.55[4]-6.65[4]	....	6.20-6.30	6.15-6.25	6.05[4]-6.15[4]	8.00[14]-8.10[14]	....	10.30[15]-10.40[15]	....
Salt Lake City	6.15-7.05	....	8.30-8.45	7.10-7.35	....	5.75-6.40	6.65-6.80	6.95-7.25	7.55-8.15	....	....	.....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 800 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1 and over; (7) 400 to 14,999 lb; (8) 400 over; (9) 500 to 1999 lb; (10) 500 to 9 (11) 400 to 3999 lb; (12) 450 to 3749 lb 400 to 1999 lb; (14) 1500 lb and over 1000 to 4999 lb; (16) 4000 lb and over up to 1999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	44.00	44.50	45.00	45.50	.....
Birmingham	42.88	43.38	.....	.....	.....
Buffalo	44.00-46.00*	44.00-46.00*	44.50-46.50*	.....	.....
Chicago	43.00	43.00	43.50	44.00	.....
Cleveland	43.00	43.50	43.50	44.00	48.00
Duluth	43.00	43.50	44.00	44.50	.....
Erie	42.50	43.00	43.50	44.00	.....
Everett	.....	48.75	49.25	.....	.....
Granite City	47.90	48.40	48.90	.....	.....
Neville Island	46.00	46.50	46.50	.....	.....
Provo	43.00	43.50	.....	.....	.....
Sharpsville	43.00	43 50	43.50	44.00	.....
Steelton	44.00	44.50	45.00	45.50	50.00
Struthers, Ohio	42.50	.....	.....	.....	.....
Swedeland	50.00	50.50	51.00	51.50	.....
Toledo	42.50	43.00	43.50	44.00	.....
Troy, N. Y.	.....	.....	.....	.....	50.00
Youngstown	43.00	43.50	43.50	44.00	.....

DELIVERED PRICES† (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer
Boston	Everett	$0.50 Arb.	.....	48.75	49.25	.....
Boston	Steelton	6.27	50.27	50.77	51.27	51.77
Brooklyn	Bethlehem	3.90	47.90	48.40	48.90	49.40
Cincinnati	Birmingham	6.09	48.97	49.47	.....	.....
Jersey City	Bethlehem	2.39	46.39	46.89	47.39	47.89
Los Angeles	Provo	6.93	49.93-	50.43	.....	.....
Mansfield	Cleveland-Toledo	3.03	45.53-46.03	46.03-46.53	46.53	47.03
Philadelphia	Bethlehem	2.21	46.21	46.71	47.21	47.71
Philadelphia	Swedeland	1.31	51.31	51.81	52.31	52.81
Philadelphia	Steelton	2.81	46.81	47.31	47.81	48.31
San Francisco	Provo	6.93	49.93	50.43	.....	.....
Seattle	Provo	6.93	49.93	50.43	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....

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* Republic Steel Corp. price: Basis: pig iron at Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Buffalo as s in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —$56.50; f.o.b. Buffalo—$57.75. Add $1.25 per ton for each additional 0.50 pct Si. up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton fo pct or more P. Bessemer ferrosilicon are $1.00 per ton above silvery iron pri comparable analysis.

Charcoal pig iron base price for low phorus $62.00 per gross ton, f.o.b. Tenn. Delivered Chicago, $69.55. High phorus charcoal pig iron is not being duced.

romanganese

-82% Mn, Maximum contract base
e, gross ton, lump size, f.o.b. Balti-
e, Phila., New York..............$145
b. Birmingham $150
b. Niagara Falls, Alloy, W. Va., Wel-
nd, Ont. $145
oad lots (bulk) $145
b. Rockwood, Tenn...............$150
ton lots (packed)..................$189
b. Etna, Pa. $148
.80 for each 1% above 82% Mn;
ılty, $1.80 for each 1% below 78%.
iquets—Cents per pound of briquet,
ht allowed, 66% contained Mn.

	Eastern	Central	Western
oad, bulk ...	8.70	8.95	9.50
lots	10.30	10.90	12.80
ton lots	11.20	11.80	13.70

egeleisen

ntract prices, gross ton, lump, f.o.b.
nerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
oads	$51.00	$52.00
). Pittsburgh..	55.00	56.00

ganese Metal

ntract basis, 2 in. x down, cents per
d of metal, f.o.b. shipping point,
ht allowed, eastern zone.
% min. Mn, 0.2% max. C, 1% max.
% max. Fe.

oad, bulk	32
. lots	34

trolytic Manganese

).b. Knoxville, Tenn., freight allowed
of Mississippi, cents per pound.

oads	32
lots	34
ton lots	36

-Carbon Ferromanganese

ntract price, cents per pound Mn con-
ed, lump size, f.o.b. shipping point,
ht allowed, eastern zone.

	Carloads	Ton	Less
% max. C. 0.06% 90% Mn.	23.00	24.85	26.05
% max. C.	22.50	24.35	25.55
% max. C.	22.00	23.85	25.05
% max. C.	21.50	23.35	24.55
% max. C.	21.00	22.85	24.05
% max. C., 0% max. Si.	18.00	19.85	21.05

omanganese

ntract basis, lump size, cents per
d of metal, f.o.b. shipping point,
ht allowed, 65-70% Mn, 17-20% Si,
max. C.

oad bulk	7.80
lots	9.45
uet, contract, basis, carlots, bulk ight allowed, per lb of briquet	8.75
lots	10.35
ton lots	11.25

ry Iron (electric furnace)

14.01 to 14.50 pct., f.o.b. Keokuk,
, openhearth $78.00, foundry, $79.00;
5 f.o.b. Niagara Falls; $77.50 f.o.b.
son, Ohio. Electric furnace silvery
is not being produced at Jackson.
$1.00 per ton for each additional
% Si up to and including 18%. Add
for each 0.50 pct Mn over 1 pct.

on Metal

ntract price, cents per pound con-
d Si, lump size, f.o.b. shipping point,
ht allowed, for ton lots packed.

	Eastern	Central	Western
Si, 2% Fe..	16.90	17.50	18.10
Si, 1% Fe..	17.30	17.90	18.50

on Briquets

ntract price, cents per pound of
et, bulk, f.o.b. shipping point, freight
ed to destination, 40% Si, 1 lb Si
ets.

	Eastern	Central	Western
oad, bulk ...	5.25	5.50	5.70
lots	6.85	7.45	7.75
ton lots ...	7.75	8.35	8.65

ric Ferrosilicon

ntract price, cents per pound con-
d Si, lump size in carloads, f.o.b.
ing point, freight allowed.

	Eastern	Central	Western
Si	16.50	....	....
Si	9.30	9.80	10.00
Si	11.80	12.10	12.85
Si	13.30	13.60	14.35
Si	15.00	15.30	16.00

um Metal

stern zone contract prices, cents per
d of metal, f.o.b. shipping point,
ıt allowed. Add 1.5¢ for central
3.5¢ for western zone.

	Cast	Turnings	Distilled
ots	$1.85	$2.70	$3.40
ton lots	2.20	3.05	4.20

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, Contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	26.50	26.90	27.00
0.10% C	26.00	26.40	26.50
0.15% C	25.50	25.90	26.00
0.20% C	25.25	25.65	25.75
0.50% C	25.00	25.40	25.50
1.00% C	24.50	24.90	25.00
2.00% C	24.25	24.65	24.75
65-69% Cr, 4-9% C	18.60	19.00	19.15
62-66% Cr. 4-6% C. 6-9% Si.	19.45	19.85	20.00

Briquets — Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk ...	12.50	12.75	12.85
Ton lots	14.00	14.90	15.50
Less ton lots....	14.90	15.80	16.40

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	19.70	20.10	20.25
Ton lots	21.85	23.15	23.95
Less ton lots	23.35	24.65	25.45

..Low carbon type: 62-66% Cr, 4-6% Si, 4-6% mn, 1.25% max. C.

	Eastern	Central	Western
Carload	25.00	25.40	25.50
Ton lots	27.30	27.95	29.15
Less ton lots ...	29.10	29.75	30.95

Chromium Metal

Contract prices, cents per lb, chromium contained carload packed, f.o.b. shipping point freight allowed, 97% min. Cr. 1% max. Fe.

	Eastern	Central	Western
0.20% max. C. ..	97.00	98.50	99.75
0.50% max. C. ..	93.00	94.50	95.75
9.00% min. C. ..	91.50	93.00	94.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe
Cr 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	16.25	16.75	18.80
Ton lots	19.35	20.10	22.25
Less ton lots	20.85	21.60	23.75

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	17.50	18.00	20.05
Ton lots	19.80	20.65	22.40
Less ton lots	20.80	21.65	23.40

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	18.00	19.10	21.05
Less ton lots	19.25	20.35	22.30

V Foundry Alloys

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn. V-7: 28-32% Cr, 15-21% Si, 14-16% Mn.

Ton lots	14.60¢
Less ton lots	15.85¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed. Si 56%, Ti 9%, Ca 5%.

Ton lots	17.90¢
Less ton lots	19.40¢

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	15.75	16.85	18.80
Less ton lots	17.00	18.10	20.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained W, 5 ton lots, freight allowed...	$2.25
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos).....	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound Contained V_2O_5	$1.20
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb	
Ton lots	$2.50
Less ton lots	$2.55
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	95¢
Calcium molybdate, 45-50%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo..........	80¢
Molybdenum oxide in bags, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.........	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton....	$152.50
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload...........	$75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	18.40¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy.	
Carload, bulk	6.00¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	7.20¢
Ton lots	7.70¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	10.50
Ton lots	11.25

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Ton lot	$1.20	$1.21	$1.23

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Eastern	Central	Western
Ton lots	$1.89	$1.903	$1.935
Less ton lots.	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

	Eastern	Central	Western
Less ton lots...	$1.80	$1.81	$1.84

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.	
Carload lots	39.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound...........	45¢
Less ton lots, per pound.......	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y., freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound...........	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3%-4%, Si 40%-45%, per lb contained B...............	$6.25

U. S. Steel's Economist In Strong Defense Of His Capacity Argument

New York

• • • **Louis H. Bean's** reassertion of his former prophecies of steel demand (THE IRON AGE, Aug. 5, p. 104) has drawn fire from Bradford B. Smith, U. S. Steel Corp. economist.

Mr. Bean had criticized an article written by Mr. Smith called "America's Steel Capacity," which was issued several months ago by the American Iron and Steel Institute. In a letter to THE IRON AGE this week Mr. Smith answered Mr. Bean by declaring that:

"No one needs to be much concerned about Mr. Bean's steel phophecies any more, not only because he stretched statistical techniques beyond the limits of good practice in making them, but also because he is now in the unfortunate position of already having been dramatically disproved by the facts.

"For example, over a year ago he testified to a Congressional Committee that 'for the years 1947-1950, a total employment in civilian jobs of 58 million would require over 100 million tons of steel.' We are right in the middle of the specified period with employment above and production (at about 88 million tons) well below the amounts he specified."

Mr. Smith continued: "He is reported as asserting that my 'estimates of needed capacity are based on the occurrence of another major depression.' I made no estimates of 'needed capacity' and specifically warned that my estimates of long-term trend could not be so regarded. What I actually said on this point is that current demand 'is far above any rational peacetime normal, even supposing that there never was another depression.'

"He presumes to assert that I believe 'that the steel industry has now matured to the point where the total demand for its products has about stopped growing.' What I actually said on this matter was with respect to per capita demand which is something quite different from total demand. I said, 'the growth trend in per capita steel demand cannot, in good sense, be expected to be as rapid now as in the heyday of discovery and development. The possibility of further large-scale innovations in steelmaking should not, of course, be precluded—no one knows the future, and it is always full of surprises.'

"He claims that I did 'not take into account the vast amount of steel that was diverted from normal civilian to military demand.' What I actually said was, 'war holds back all peacetime demands, then turns them loose to focus simultaneously upon the steel producers.'

"He pretends that my estimates of 'normal or long-term trend in per capita demand for steel (not the momentary, or war, or reconstruction peak)' are comparable with his disproved guesses of 'full employment' requirements; but he notes—correctly!—that I find the current level of such long-term trend to lie between 59 and 71 million tons.

"He then says that my 'normal figures are an average of steel production in the prosperity of the 1920's and the depression of the 1930's.' Since production, for the period, 1920-1939, averaged 43 million tons—far less than the 59-71 estimate—this Bean misrepresentation transcends irreverence for the truth to achieve an amusing arithmetic absurdity."

Construction Steel . . . .

• • • **Steel piling awards** this week included the following:

2000 **Tons,** Mexico City, dam across Colorado River in Baja, Calif., eight miles south of Yuma, through Morrison-Knudson, to Bethlehem Steel Co., Inc., Bethlehem, Pa.

• • • **Reinforcing bar inquiries** this week included the following:

480 **Tons,** Los Angeles, grade separation on Santa Ana Parkway between La Verne and Eastland, Calif., Div. of Highways, Los Angeles, bids to Sept. 2.
250 **Tons,** Quincy, Ill., power house for the Soldiers and Sailors Home through State of Illinois.
240 **Tons,** Carbondale, Ill., training school alterations for Illinois Normal.

• • • **Reinforcing bar awards** this week included the following:

1500 **Tons,** Mexico City, dam across Colorado River in Baja, Calif., eight miles south of Yuma, through Morrison-Knudson, to Bethlehem Steel Co., Inc., Bethlehem, Pa.
205 **Tons,** Springfield, Ill., exhibition hall for State of Illinois, through Lloyd Builders Co. to Laclade Steel Co.

• • • **Fabricated steel inquiries** this week included the following:

4770 **Tons,** Brooklyn, N. Y., New York City bus depot.
1165 **Tons,** Elsmere, Del., Delaware Dept. of Highways, bridge, due Sept. 11.
817 **Tons,** Washington County, Pa. bridge Pennsylvania Dept. of Highways, due Aug. 20.
565 **Tons,** Los Angeles, grade separation on Santa Ana Parkway between La and Eastland, Calif., Div. of High Los Angeles, bids to Sept. 2.
100 **Tons,** Ashland, Pa., factory buildin Ashland Shirt & Pajama Co., due 24.

• • • **Fabricated steel awards** week included the following:

935 **Tons,** Milwaukee, brew house for Joseph Schlitz Brewing Co., to Milw Bridge & Iron Co., Milwaukee.
545 **Tons,** Milwaukee, diesel service bui for the Milwaukee Railroad through Construction Co. to American Bridge Pittsburgh.
450 **Tons,** Brownstown, Wis., bridge se F030-2-8 State Highway Dept. to lehem Steel Co., Inc., Bethlehem.
390 **Tons,** Winamac, Ind., state hig bridge section 2929 to Bethlehem Co., Inc., Bethlehem.
300 **Tons,** Palisade, Colo., state hig bridge section S-0146-1 through I Hesser to Midwest Steel & Iron V Co., Denver.
270 **Tons,** Indianapolis, state highway b section 3016 to Bethelhem Steel Co., lehem.
180 **Tons,** Racine Co., Wis., state hig bridge section S084-1 and S055-1 to lehem Steel Co., Inc., Bethlehem.
150 **Tons,** Page Co., Iowa, state hig bridge section ERS17-5 through We Engineering Co. to Pittsburgh-Des M Steel Co.
140 **Tons,** Lebanon, Pa., Lebanon Steel dry Co. through Hughes Foulkrod C Bethlehem Steel Co., Inc., Bethlehem
115 **Tons,** Menomonee, Wis., state hig bridge section T06-4-2 to Bethlehem Co., Inc., Bethlehem, Pa.

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50 YEARS AGO

THE IRON AGE, *August 19, 1898*

• "Building competition between the European navies goes on merrily. Great Britain's original program included three new battleships and a total outlay of $35 million. Since that time Russia has announced plans for building eight battleships and numerous lesser vessels at a total outlay of $250 million. England has now announced plans for four more battleships and smaller vessels."

• **"Austin A. Wheelock and Frederick B. Lovejoy have formed a partnership under the firm name of Wheelock & Lovejoy. They are organized to do business as jobbers for the iron and steel industry."**

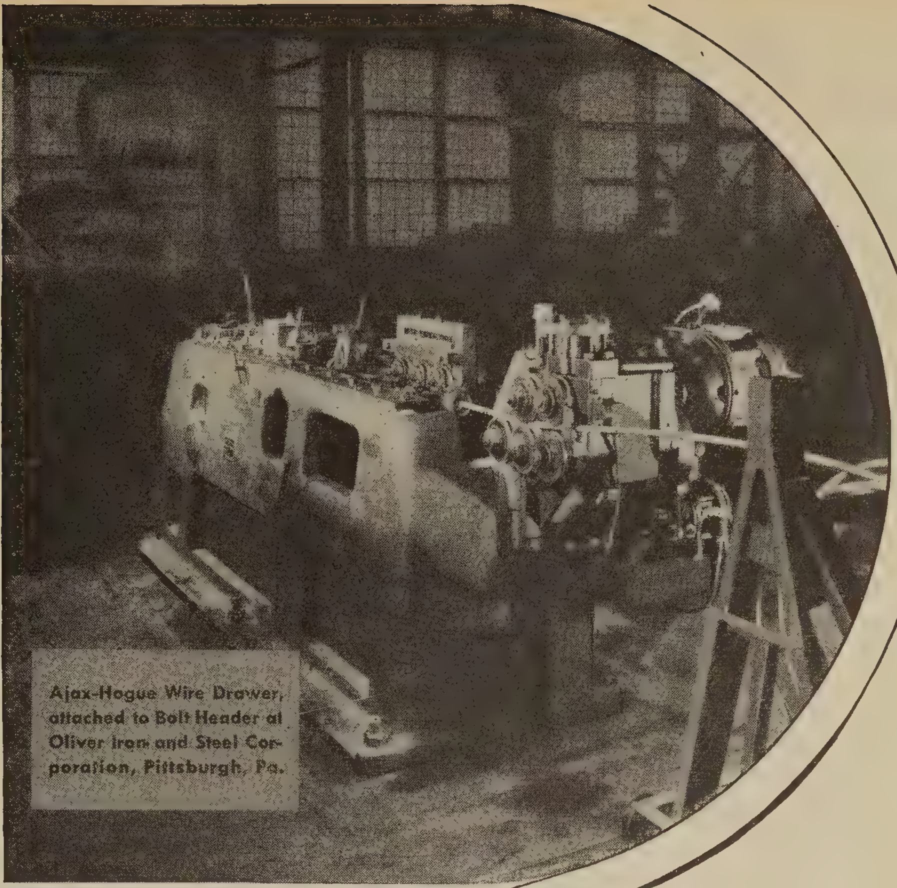
• "When the Spanish war clouds began to gather we expressed the opinion, contrary to that held by many in the trade, that the outbreak of hostilities would injuriously affect the iron industry. That it did hold back business is now generally acknowledged. Therefore it is reasonable to assume that with peace assured we may expect an early revival."

• **"Fifes for the Army are now being made out of seamless nickel-aluminum tubing by Ellwood Ivins Tube Co. of Philadelphia."**

• "Hydrogen was liquified for the first time recently by Professor Dewar of England. Now nothing except the cost stands in the way of producing liquid hydrogen in any quantity that science may require."

• **"It is interesting to note the manner in which the theft of coal from railroad cars is handled. In districts where railroad competition is heavy, railroads stand the loss. In other districts where mines are scarce and a brand of coal is well advertised, dealers made up for the loss. In districts such as Kentucky where mines are plentiful and competition is great, the mine operator stands the loss."**

all types of cold headers should have

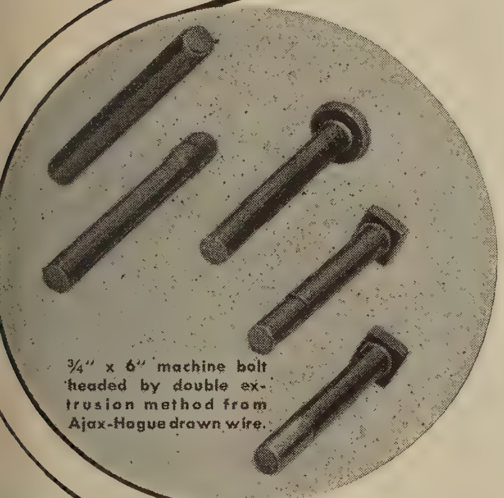


Ajax-Hogue Wire Drawer, attached to Bolt Header at Oliver Iron and Steel Corporation, Pittsburgh, Pa.

AJAX-HOGUE WIRE DRAWERS

The Ajax-Hogue Wire Drawer . . . a simply installed attachment for cold headers . . . cold draws, coats and supplies the heading machine with clean, accurately round wire. Substantially longer header die life, lower raw material cost, and improvement in the quality and accuracy of the product are important money saving advantages gained by the use of Ajax-Hogue Wire Drawers. No matter what makes of headers you operate or how many, you can improve cold heading efficiency with Ajax-Hogue Wire Drawers.

WRITE FOR BULLETIN No. 111.



¾" x 6" machine bolt headed by double extrusion method from Ajax-Hogue drawn wire.

THE Ajax MANUFACTURING COMPANY

EUCLID BRANCH P. O. CLEVELAND 17, OHIO

110 S. DEARBORN ST.
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DEWART BUILDING
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TYPE DBZ
TYPE DSM
TYPE CM
TYPE ST
TYPE AM
TYPE SS
TYPE DBZ-D
HIGH SPEED HEAVY DUTY FLOATING SHAFT TYPE FLEXIBLE COUPLING

THOMAS *Flexible* COUPLINGS

....are specified by engineers, wherever 100% Operating Efficiency is demanded

THOMAS *Flexible* COUPLINGS provide for Angular and Parallel Misalignment as well as Free End Float... *and Eliminate* BACKLASH, FRICTION, WEAR and CROSS-PULL

NO LUBRICATION IS REQUIRED!

The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.

WRITE FOR COMPLETE ENGINEERING CATALOG

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

Becomes Technical Director for Armco International Co

Middletown, Ohio

• • • **J. S. Ferguson**, general perintendent of the Hamilton p of Armco Steel Corp., has been pointed technical director of Argentine Steel Div. of the Ar International Corp.

He will depart for the Argen shortly where he will serve as son officer with the companies w will build a large completely i grated steel plant at San Nicola the Parana River. Mr. Ferguson make his headquarters in Bu Aires.

The plant will consist of mo coke ovens, a by-products plan large blast furnace, open hea a blooming mill, a structural rail mill, a modern strip mill a tin plate plant.

In 1931 Mr. Ferguson went to sia where he helped construct Kuznetskstroi plant at Stalinsk beria. He remained after the struction was completed to help the Russian plant into opera returning to the United State 1933.

Later in the same year he a went overseas to aid in comple the South African Iron and Industrial Corporation's plan Pretoria, South Africa, remai there until 1934.

He has been a member of Armco organization continu since 1919, when he was empl as superintendent of the blast nace department at the compa Ashland plant. He was made m ager of a plant Armco form owned in Columbus in 1923. In he was transferred to the Ham Armco plant as manager of pig sales. He became general sup tendent of that plant in 1935.

Auto Sales During June 27 Pct Higher Than

Detroit

• • • **Factory sales of** motor cles from U.S. plants during totaled 431,033 units, an increa 27% above May, the Autom Manufacturers Assn. announce

The return to production of manufacturers, one strike-b during part of May, the other

KAYDON Radial Ball Bearings
15.000″ x 19.000″ x 2.000″
in Food Machinery
Corporation's New Juicer

KAYDON BEARINGS
*help SUPER JUICER squeeze 480 OPM**

*Oranges per minute

KAYDON Bearings play a very important part, say the designers, in this remarkable machine, so aptly christened the FMC SUPER JUICER. **KAYDON** precision radial bearings support the entire revolving head, including the actuating cam and upper cups of the squeezing mechanism, the head traveling smoothly, 24 revolutions per minute.

SUPER JUICER is *right!* Produces upwards of 300 gallons of juice per hour. It's super *juice,* too . . . tastes fresher, keeps better . . . since the juicing operation keeps the juice from the inside of the citrus fruits from mixing with the oil from the rind.

FMC engineers recognize the advantages of **KAYDON** precision bearings, just as designers of many other types of heavy-duty machinery do, in such widely varied fields as oil field machinery, rock-crushers, grinders, steel mills and paper mills, road equipment, excavators, hoists, bending machines and other heavy-duty equipment.

For sound bearing-cooperation, contact **KAYDON.**

KAYDON *Types of Standard or Special Bearings:*
Spherical Roller • Taper Roller
Ball Radial • Ball Thrust
Roller Radial • Roller Thrust

THE KAYDON ENGINEERING CORP.
MUSKEGON • MICHIGAN

All types of Ball and Roller Bearings 4″ bore to 120″ outside diameter

Write Levinson
FOR WAREHOUSE STEEL PRODUCTS

LEVINSON
STEEL SALES CO.
PITTSBURGH, PA.

ALSO DISTRIBUTORS OF PLASTEEL ROOFING, REYNOLDS ALUMINUM, THORN STEEL WINDOWS

ing prepared for the introduct of new models, were major fact in the industry's increased outp Also, there were two more work days in June as against May. Ma rial shortages. however, still c tinued to limit output, the A reported.

June factory sales included 312, passenger cars, 117,572 motor tru and 1055 motor coaches. Total p duction for May was 338,531 un made up of 225,461 passenger c 111,789 motor trucks and 1281 r tor coaches. The peak month post-war production was last Ma when 492,013 motor vehicles w turned out.

Factory sales of motor vehi for the first 6 months of 1948 taled 2,488,301 units, or 6 pct ab the 2,348,647 vehicles produced the comparable period in 1947, AMA said.

G.M. Declares Dividends

New York

• • • **The Directors** of Gene Motors Corp. have declared a di dend of $1.00 per share on the o standing common stock, paya Sept. 10, 1948, to stockholders record Aug. 12, 1948.

Regular quarterly dividends $1.25 per share on the $5 se preferred stock and $.9375 per sh on the $3.75 series preferred st were declared, payable Nov. 1, 1 to stockholders of record Oct. 1948.

The Board of Directors elec F. L. Burke and Edward R. God members of the board and of corporation's Operations Pol Committee. Mr. Burke is vice p ident of General Motors in cha of the accessory group, and Godfrey is vice president in cha of the Dayton and household pliance divisions.

Kaiser Prices, Wages Up

Oakland, Calif.

• • • **Kaiser Co., Inc.** has nounced a wage increase avera 13 cents an hour to the CIO Workers Union at the Font steel plant.

Simultaneously, the Fonta plant increased its prices an a age of $9.83 a ton "to cover wage increase and other moun costs of production which been reflected recently in si industry-wide increases."

ate Mediation Board Issues 6 Month Report

w York

• • **The New York** State Media- n Board disposed of 813 cases ring the first 6 months of 1948, cording to industrial commis- ner Edward Corsi, head of the ate Labor Department. This to- represents on increase of 56 t over the 521 cases closed during e same period of last year. The mber of cases on hand during e first half of this year totalled 22.

More than half of the cases sed involved potential work ppages and 15 pct were con- rned with actual work stoppages. the remainder of the cases, ike threats had been eliminated advance through agreements be- een the disputing parties.

The total number of arbitrations sposed of by the board during the st 6 months of this year also ceeded the total for the first lf of 1947, 713 as compared with 2. Half of the arbitration cases re handled by board and staff embers and the other half by tside arbitrators designated by e board.

.S.M.E. to Hold Fall Meeting at Portland

w York

• • **The American Society** of echanical Engineers will co-fea- re the hydroelectric power re- urces and the wood industries of e Pacific Northwest during its an- al fall meeting at Portland, Ore., pt. 7 to 10.

Other subjects will include papers petroleum, aviation materials ndling, engineering education, etals engineering and manage- ent.

Ten technical sessions will in- ude 2 symposia, one on hydro- ectric power and the Northwest d one on light metals.

Dr. A. J. Groening is scheduled to eak on Atoms for Peace while Dr. ilson M. Compton's subject will be Engineering in an Era of Big ience and Big Government.

Visiting members of the ASME ll inspect installations at Bonne- le Dam, 42 miles from Portland; e world's largest sawmill at Long- ew, about 50 miles down the Co- mbia River; and a number of anufacturing plants in the area.

Write Levinson

FOR FABRICATED STRUCTURAL STEEL

LEVINSON
STEEL COMPANY
PITTSBURGH, PA.

ALL TYPES OF STRUCTURAL AND
MISCELLANEOUS STEEL FABRICATION

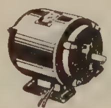
Where is the safest position for a lifting magnet's weld—

here?
here?
or here!
OHIO

• Operating men who have seen the beating a magnet takes in service know that TOP OF THE MAGNET is the safest place for a weld. *Only new Ohio PROTECTO-WELD Magnets offer you this advantage!*

They're built to withstand harder knocks day in and day out for years. Outer ring and top plate are welded together ON TOP OF THE MAGNET. This protected weld retains its shape, is never dented in. The weld can be turned down for magnet disassembly without cutting away outer ring . . . *without destroying outer pole.*

For extra years of low-cost operation, invest in Ohio PROTECTO-WELD Magnets. They operate cooler . . . lift more uniformly over extended periods of operation . . . last longer. Sizes include 39, 46, 55 and 65-inches diameter. For details, write today to Ohio—*leader in magnetic materials handling.*



Ohio is also a leading name in the small motor industry

ohio
MAGNETS

THE OHIO ELECTRIC MFG. CO.
5908 MAURICE AVE. • CLEVELAND 4, OHIO

(Continued from page 112)

PERSONALS

• **Donald B. McCammond** has be
appointed assistant to the direc
of industrial and public relatio
Monsanto Chemical Co., St. Lo

• **James G. Zack,** divisional dir
tor of public relations for M
santo's plastics division in Sprir
field, Mass., has been transfer
to St. Louis headquarters for
company to supervise industr
relations publications for the
partment.

• **V. St.C. Monteith** has been
pointed manager of the plant
gineering department, Dayton R
ber Co., Dayton, succeeding **L.**
Gordon, who died recently.
Monteith became associated w
Dayton Rubber in 1945 and si
that time has been handling s
cial assignments in the engine
ing department.

• **Joseph Chini** has been appoin
superintendent of the foundry di
sion of Sperry Gyroscope Co., Gr
Neck, N.Y., succeeding **Stanley**
Tims, who has resigned. Prior
joining Sperry as general forem
in 1943, Mr. Chini was super
tendent of the Howard Foundry
Chicago.

• **Paul J. Kreischer** has been
pointed manager of the new To
wanda, N.Y. plant of the Contai
Co., a Continental Can Co. s
sidiary. He was formerly assist
manager of the company's
Wert, Ohio, plant. **Donald F. C**
non, formerly New York sales m
ager, has been named general s
manager for the Tonawanda pl

• **Roger M. Kyes** has joined
staff of General Motors Corp.,
troit, working on special assi
ments and reporting directly to
president. Previous to his new
pointment Mr. Kyes was presid
and general manager of Harry F
guson, Inc.

• **James E. Coleman** has b
named assistant purchasing ag
for the Pittsburgh group of as
ciated natural gas companies
the Columbia Gas System, Inc.
Coleman joined the public uti
organization in 1937 as an inc
trial engineer. Since 1945 he
been assistant sales manager.

• **L. B. McGrew, R. C. Waldie, J**
Penske, Jr. and **W. P. Dettw**
have been elected to the boarc
directors of Williams & Co., I
Pittsburgh. Mr. McGrew has b
with the company since 1918
now serves as assistant mana

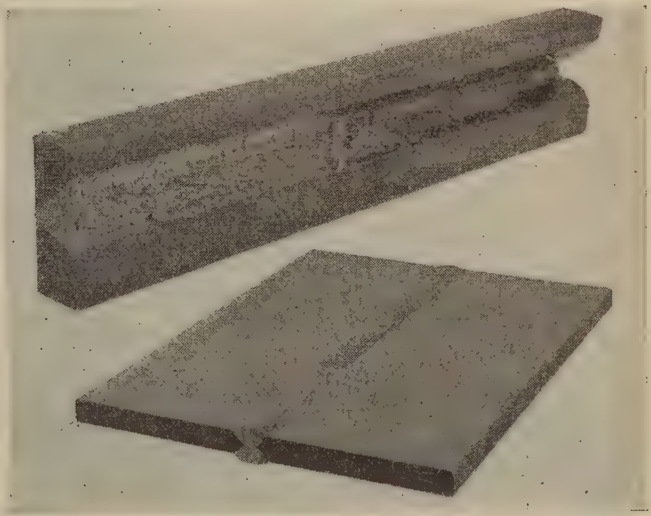
New Electrode Solves Many Welding Problems

incoln "Shield-Arc LH-70," for mild steel and hard-to-weld steels, operates in all positions, a.c. or d.c.

SILY MACHINED. This manufacturer of tire molds, de of high-sulphur (free machining) steel, has simpli- l repair work with "Shield-Arc LH-70" because its posits are easily machined and dense. Ribs in mold wn are being built up along edges due to machining or. Welded ribs will then be machined to proper size.

BANISHES POROSITY. In fabricating sprockets, this manufacturer welds together a disc of mild steel plate and a hub of round cold-rolled stock as shown. Formerly welds were porous; with "Shield-Arc LH-70," they are dense and smooth.

IMINATES HEAT-TREATMENT. In the welding of high- rbon, thin-walled tubing, this Company had to use stly heat-treating. This has been eliminated by weld- g with "Shield-Arc LH-70." Similar benefits are ing obtained for high-tensile steels and welds to be rcelain enameled without annealing.



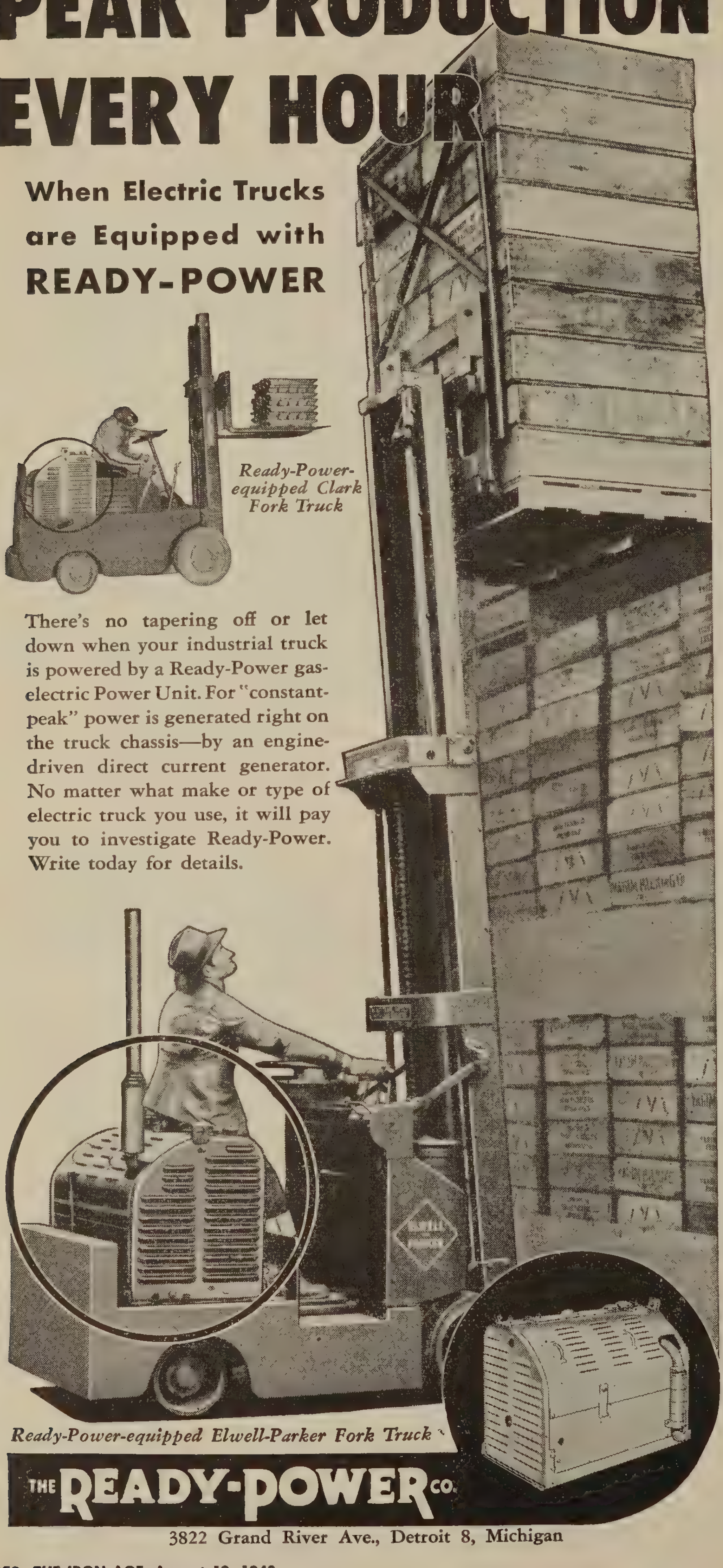
EASY . . . FAST. Many shops are using "Shield-Arc LH-70" for mild steel. On bevelled horizontal butt joints (above), it eliminates need for or materially reduces back-chipping and it can be used with easy straight-drag technique—no whipping required. On down-hand square butts (below), "LH-70" gives 15% to 20% faster welding because of ability to use higher current and get deeper penetration.

e above is published by LINCOLN ELECTRIC in the interests of progress. For further information on "Shield-Arc LH-70," write The Lincoln Electric Company, Dept. 69, Cleveland 1, Ohio.

Advertisement

PEAK PRODUCTION EVERY HOUR

When Electric Trucks are Equipped with READY-POWER



Ready-Power-equipped Clark Fork Truck

There's no tapering off or let down when your industrial truck is powered by a Ready-Power gas-electric Power Unit. For "constant-peak" power is generated right on the truck chassis—by an engine-driven direct current generator. No matter what make or type of electric truck you use, it will pay you to investigate Ready-Power. Write today for details.

Ready-Power-equipped Elwell-Parker Fork Truck

THE READY-POWER CO.

3822 Grand River Ave., Detroit 8, Michigan

in charge of warehouse operatio Mr. Waldie joined the company 1924 and since 1928 has been ma ager of the welding wire and boil tube department. Mr. Pens started with the company in 19 He has been district manager the Cleveland branch operatio Mr. Dettwiler joined the Willia organization in 1927 and becar manager of the Cincinnati war house operation in 1930, continui in that capacity.

• **Edward L. Usner** has be named assistant to the vice-pre dent in charge of manufacturi Studebaker Corp., South Bend, I **Bernard M. Finnigan** has been a pointed to the newly-created po tion of director of management i formation.

• **Henry B. Clark** has been a pointed manager of the New Yo sales office of Diamond Alkali C succeeding **Charles V. Douglas,** w has resigned. Mr. Clark has be branch manager of the compan Boston sales office since 19 **Charles L. Flaccus, Jr.,** has be named assistant branch manag in New York.

• **Dr. Karl T. Compton,** preside of Massachusetts Institute of Tec nology and **Merrill Griswold,** cha man of Massachusetts Invest Trust, have become directors Tracerlab, Inc., Boston.

• **John E. N. Hume,** commerc vice-president, General Electric Schenectady, has retired after years of service. Mr. Hume joi GE in 1907 and became associa with the switchboard engineeri department. He was later tra ferred to the Baltimore office salesman and returned to Schen tady in the industrial departm of which he later became mana of sales of the mining and st section. He became successiv manager of the motor division, sistant manager, and then ma ager of the industrial departm and was elected a commercial vi president in 1938. **John G. Hock** and **Harold Ward** have been pointed accountants for the c duit products division and wire cable division, respectively, of company at Bridgeport, Co **Harold J. Lee** has been nam cashier and paymaster of the c struction materials departme Formerly accountant for the cl division, Mr. Hocking joined GE

ON AMERICA'S AIR FLEET

Foote Bros. Power Units and Actuators

Modern aircraft operation demands a high degree of automatic control to free pilots from tasks that mechanical units can perform better.

Because of the pioneering done by Foote Bros. in the production of aircraft devices—because of the ability of Foote Bros. engineers to solve problems faced in designing gear units of minimum weight to fit in a confined space—because of the complete facilities, modern techniques, and wide experience found in Foote Bros. large plants—actuators and power units produced by Foote Bros. are serving on many of the leading airplanes that form America's air fleet.

A-Q (aircraft quality) Gears that contribute so much to the efficiency of these units are also employed on turbo-jet engines and on such reciprocating engines as the Wasp Major.

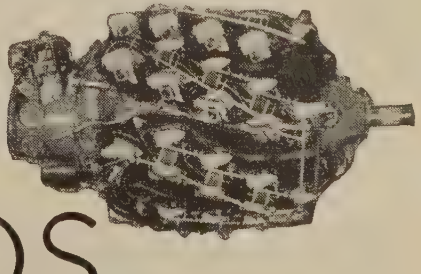
The ability of Foote Bros. to serve the highly specialized demands of the aircraft industry is a good testimonial to the ability of Foote Bros. engineers to provide you with better gears, power units, and enclosed gear drives to meet even the most exacting specifications.

Whatever your requirements, call Foote Bros.

FOOTE BROS. GEAR AND MACHINE CORPORATION
Dept. M, 4545 S. Western Blvd. • Chicago 9, Illinois

Accessory Drive on Turbo Jet Engine

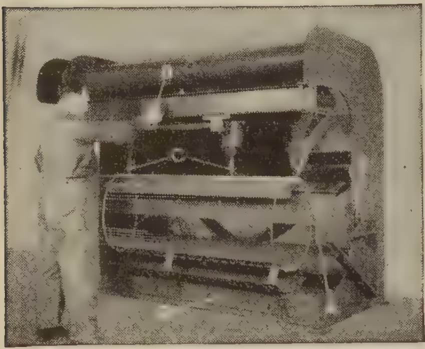
Precision Gears on Pratt and Whitney Wasp Major



FOOTE BROS.

Better Power Transmission Through Better Gears

40 Welds
with
NO HANDLING
OF THE WORK



Semi-Automatic { INDEXING
Automatic { WELDING
SIZING

. . . and the machine will handle two diameters and any length of water heater shells.

That's the kind of economy you get when the job is worked out by PROGRESSIVE WELDER.

For this story plus "Assembling Nash Suspensions"; "Traveling Gun Welders Solve Many Problems"; "Seam-Welding Panels from Strip"; etc., see . . .

RESISTANCE WELDING PICTORIAL NO. 47
Ask for it today

IT PAYS TO WELD
PROGRESSIVE
WELDER COMPANY
3050 E. OUTER DRIVE, DETROIT 12, U.S.A

1936. Mr. Ward became affiliated with the company in 1929 and has been accountant for the conduit products division. Mr. Lee joined the firm in Schenectady in 1922 and was formerly assistant cashier and paymaster of the appliance and merchandise department.

- **Robert Watson** has been appointed representative of the Railway Equipment Div., American Welding & Mfg. Co. Mr. Watson was formerly associated with Waugh Equipment Co. He will have his headquarters in American Welding's regional offices in Chicago.

- **W. M. Ball, Jr.,** has been appointed metallurgist and foundry consultant by R. Lavin & Sons, Inc., Chicago.

- **George S. Webster** has been appointed contract manager of the Philadelphia office of Turner Construction Co.

- **Gordon Austin** has joined the sales force in the Philadelphia office of Berger Mfg. Div., Republic Steel Corp. Mr. Austin was formerly connected with the sales department of the general office in Canton.

- **William G. Brown** has been appointed sales manager for the six divisions of Howard Foundry Co., Chicago. Prior to his new appointment Mr. Brown was Chicago district manager for Bohn Aluminum & Brass Corp.

- **James B. Cunningham** has been made manager of the new Mansfield, Ohio office of the Ohio Equipment Co., Inc. Mr. Cunningham was formerly associated with the Philadelphia division of Yale & Towne Mfg. Co.

- **Thomas S. Nichols,** president and chief executive officer has been elected to the additional post of chairman of the board of Mathieson Chemical Corp., to succeed **George W. Dolan,** who died. **J. C. Leppart,** vice-president, has been elected to the board to fill the vacancy caused by Mr. Dolan's death, and was appointed executive vice-president.

- **L. M. Hackenberg,** New York district sales manager, has been appointed to supervise the activities of the new sales office for C. J. Tagliabue Corp. in New York, a subsidiary of Weston Electrical Instrument Corp., Newark, N.J.

"So you think
oil is oil..."
...says
"CHIP" WRIGH

"... Might be if you have become deadened to production headaches. Personally, I've found cutting fluids are a major factor in operating a modern metal working plant. They can make or break most jobs. And that's not hard to understand when you consider all the variables involved. Speeds, feeds, materials, tolerance and finish requirements all influence the application of a cutting fluid. Oil that is 'just oil' simply cannot give you the performance you need. Fortunately, it is a problem that can be satisfactorily solved by *qualified* cutting oil people. It's their full-time business. They have the experience plus the facilities that no individual user can match. I've learned that it pays to take advantage, not only of their tested products, but of their experience and service as well."

—Chip

Since 1865, D. A. Stuart Oil Company has devoted its entire interest to Cutting Fluids and Industrial Lubrication. This experience, plus the facilities of one of the finest laboratories in the industry, are available to help you get the most out of cutting fluids. Be sure to get Stuart's handbook, "Cutting Fluids for Better Machining."

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OBITUARIES

William B. Sawyer. Jr., assistant
eral manager of sales, Columbia
el Co., San Francisco, died July

. F. Dohn, 72, director and hon-
ry vice-president, Allegheny
dlum Steel Corp., Pittsburgh,
d July 29.

on G. Savage, 50, vice-president
l general sales manager, Thew
vel Co., Lorain, Ohio, died July

hilip W. Frieder, 58. vice-presi-
t, Philip W. Frieder Div., Luria
el Trading Corp., Cleveland, died
y 25.

rederick A. Stevenson, 68, for-
r president of American Car &
ndry Co., New York, died July

eorge S. McLaughlin, assistant
erintendent of materials, Quin-
Bethlehem shipyards, Bethle-
n Steel Co., died July 25.

illoughby H. Stuart, Jr., former
sident of the Baush Machine
l Co., Springfield, Mass., died
ently.

rederick J. King, 57, head of
minum Co. of America's produc-
n planning division, died July 27.

r. J. W. Hickman of the West-
house Electric Corp.'s research
oratory died July 26.

eorge W. Dolan, 46, chairman
the board of directors, Mathie-
Chemical Corp., New York, died
y 24.

dam A. Gintz, 47, vice-presi-
t, Unit Stove & Furnace Co.,
mingham, died July 18.

harles S. Haggarty, 80, former
nager New Orleans branch of
. Atkins & Co., died July 21.

avid Burt, Sr., 72, one of the
nders of Wheeling Steel Corp.,
eeling, W. Va., died recently.

enry S. Binns, 58, head of the
allurgical laboratory of the Cin-
nati Milling Machine Co., died
ently.

ugust F. H. Kohler, 65, founder
the Aluminum & Brass Co.,
kport, N.Y. died recently.

ohn F. Brewer, 79, of Brewer &
e, Seattle, died July 15.

. Arthur Tutein, 75, long identi-
with the pig iron trade in New
k and Boston died August 4.

rank R. Hastie, 58, assistant
nager, Boston Sales Office,
erican Radiator & Standard
itary Corp.. died July 30.

**in acrobatics
it's balance**

In metal cleaning, too, *balanced cleaners* are required.

The balanced composition of Wyandotte Metal Cleaners gives long life to solutions and permits lower concentrations, so that cleaning is economical. This balance makes Wyandotte compounds clean faster and more efficiently, resulting in economy through increased production and fewer rejects.

You get diversified applications from Wyandotte Metal Cleaners because of balanced formulas. They contain ingredients for water conditioning, saponifying, emulsifying, wetting action—plus the ingredients for a long pull. They give better rinsability.

Wyandotte Metal Cleaners give satisfaction in *all* cleaning—direct and reverse current cleaning of steel, brass, copper, magnesium, and die castings . . . still tank . . . presoak cleaning. They remove *any* soil from *any* surface in preparation for *any* finishing operation.

Let your Wyandotte Representative tell you more about the advantages of Wyandotte balanced Cleaners. He's always at your service. Just give him a call.

WYANDOTTE CHEMICALS CORPORATION • WYANDOTTE, MICHIGAN

Service Representatives in 88 Cities

Wyandotte
REG. U. S. PAT. OFF.

"Talk about refreshing-
Properly cooled water gets my vote!"
REFRIGERATION BY
Kelvinator
MADE BY
EBCO MANUFACTURING CO.
COLUMBUS, OHIO
U.S.A.

You make a strong bid for good will when you provide *properly cooled* drinking water where it's always convenient to everyone. *Cool* water *refreshes.* It makes people feel better. Increases accuracy. In fact, it's wise to *remind* people to refresh more often with *cool,* clear drinking water. Kelvinator-refrigerated Electric Water Coolers at strategic points throughout your plant, will do the trick with best results, at lowest cost. A size for every need.

Write for details.

The EBCO Manufacturing Co.
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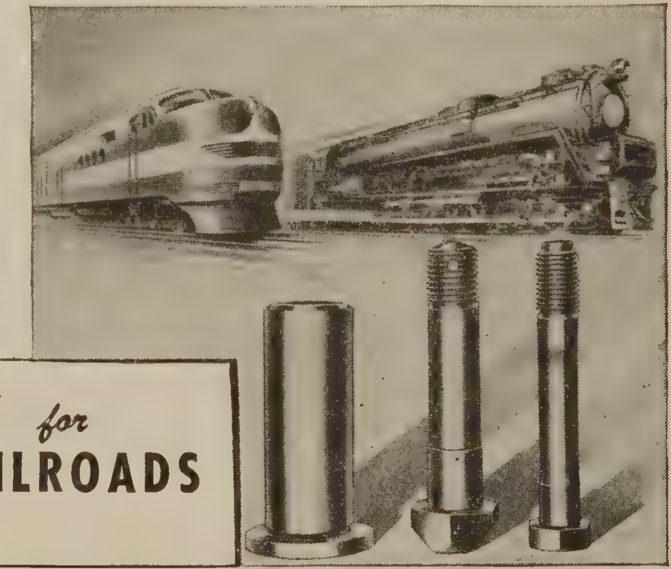
ERIE SPECIAL BOLTING
FOR HEAVY MACHINERY

FOR over 30 years ERIE has specialized in the manufacture of *high quality bolting.* We use the very latest equipment for heat treating, machining, grinding and threading. We are certain that we can produce better bolting at a saving to you because we are specialists — send us your bolting specification for our estimate.



A DEPENDABLE SOURCE OF HIGH QUALITY BOLTING FOR RAILROADS, REFINERIES, DIESELS, FARM MACHINERY, EXCAVATING EQUIPMENT AND ALL TYPES OF HEAVY MACHINERY.

ERIE BOLT & NUT CO.
SUBSIDIARY OF BARIUM STEEL CORPORATION
ERIE, PA.
STUDS • BOLTS • NUTS ~ ~ ALLOYS • STAINLESS • CARBON • BRONZE

Canadian Output Up 11 Pct for First 5 Mont

Toronto

• • • **Canadian production** of p mary zinc in all forms for M amounted to 20,482 tons compar with 19,544 tons in April and 1 951 tons in May, 1947. For the fi months ending with May produ tion totalled 93,317 tons as co pared with 86,650 tons for the li period of 1947.

Production of lead in M amounted to 12,745 tons agai 12,847 tons for April and 12,836 to for May, 1947. For the first fi months this year production t talled 62,100 tons against 65,3 tons in the like period of 1947.

During the month of May le exported from Canada amount to 10,354 tons of which 4261 to went to the U. S.; 359 tons Brazil and 5663 tons to the Unit Kingdom, while for the first months of 1948 exports totall 42,880 tons against 54,663 tons the like period last year.

For the 5 months this year e ports included 21,888 tons to t U. S.; 519 tons to Brazil; 1473 to to France; 521 tons to the Nethe lands and 18,032 tons to the Unit Kingdom.

Zinc exports for May amount to 14,762 tons of which 6592 to went to the U. S.; 615 tons to t Netherlands; 6140 tons to t United Kingdom; 336 tons to Ind and 934 tons to France. In additi zinc ore totalling 5124 zinc conte was shipped to the U. S. duri May.

For the 5 months ending wi May exports of zinc totalled 5 465 tons compared with 63,188 to for the corresponding period 1947. For the 5 months this ye exports included 28,430 tons to t U. S.; 1120 tons to Germany; 6 tons to the Netherlands; 21,2 tons to the United Kingdom; 6 tons to India and 934 tons France, while in addition ore wi zinc content shipped to the U. amounted to 20,122 tons.

Net Profits Up 32 Pct

Cleveland

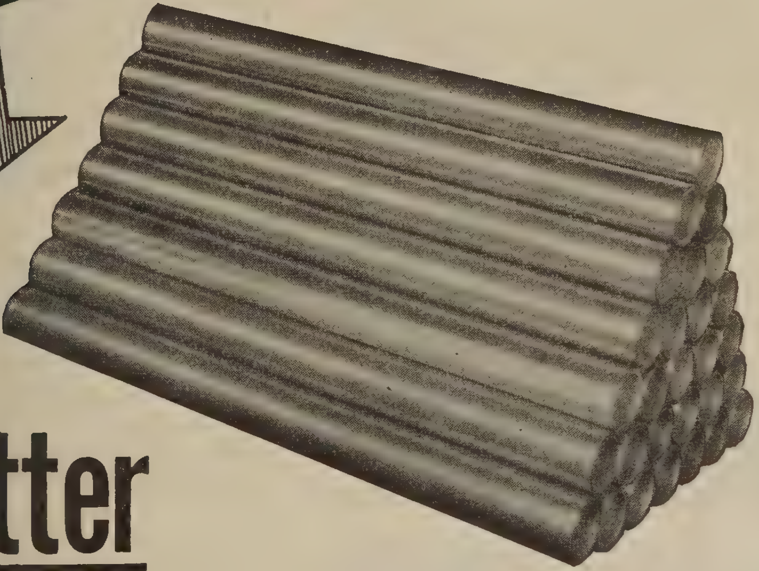
• • • **Sales of $13,497,171 and n** profit of $1,089,888 for the first ha of 1948, have been reported Cleveland Graphite Bronze Co. T

DURASPUN
Centrifugally Cast Pipe

S

Better

Pipe



Centrifugal castings are superior castings. The metal is sounder, finer-grained, more uniform. It is free of gas pockets, blow holes and other defects often difficult to keep out of static cast-
gs. Tensile strength is close to that of rolled or hot-forged alloy
el. Dimensions are accurate, usually requiring less machining
d finishing and thus speeding production.

you require *extra* qualities in your high alloy pipe, investigate
URASPUN Centrifugally Cast Pipe. We can produce it in OD
nging from 2½" to 24" and in lengths up to 15' according
diameter. Our experience in the field of centrifugal high alloy
stings dates back to 1931. Our experience in the field of static
gh alloy casting goes back to 1922. We can give you good service.

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METAL GOODS CORP: St. Louis • Houston • Dallas • Tulsa • New Orleans • Kansas City

profit is equal after preferred dividends to $1.61 a share on the 643,840 common shares.

Sales were up 9 pct and profits 32 pct over the preceding 6 months period, when sales were $12,384,158 and profits $823,441, or $1.17 a common share. In the first half of 1947, when the motor car industry was accumulating stocks of bearings greatly in excess of the rate of consumption, sales were $18,159,490 and profits $2,080,166, or $3.15 a share.

In the first half of 1948 two dividends of 40 cents each were paid on common stock and $524,118 was added to reinvestment of profit, which now stands at $13,696,855.

Second Quarter Income Drops at Inland Steel Because of High Costs

Chicago

• • • **Net income** during the second quarter for Inland Steel Co. amounted to $6,549,849, or $1.33 per share, chairman Edward L. Ryerson reported to a directors meeting in Chicago, July 28. This represents a decrease of 40c per share which Mr. Ryerson attributed primarily to higher manufacturing costs, as compared with net income for the first quarter in 1948. Income in the second quarter represented a net profit of 7.39 pct of net sales as compared with 9.34 pct of net sales during the first quarter—a decrease of 20 pct.

In a report to the directors it was pointed out that the company's net income for the second quarter last year amounted to $6,125,431 or a $1.25 per share. Profits last year were adversely affected by the 10 day steel strike in May. Net income for the six months ending July 30 this year amounted to $15,008,393 or $3.06 per share as compared with $14,121,288, or $2.88 per share during the first half of 1947.

Concerning new prices the report said, "Under a new agreement entered into with the United Mine Workers of America, effective July 1, 1948, coal miners' wages were increased 12½c per hr, and the royalty payment for the miners' welfare fund was doubled from 10c to 20c per ton. In view of the extensive wage increase recently granted by many leading industries and in the coal mining industry, your company has concluded that

SPECIAL WASHERS

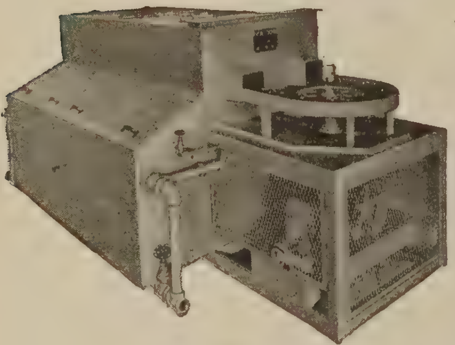
We offer you the advantage of more than 25 years of specialized experience in designing and manufacturing Special Washers. During these years we have accumulated over 10,000 sets of tools, one of which may exactly fit your specifications.

SMALL STAMPINGS

As in the case of Special Washers, we can supply Small Stampings in any metal, in any quantity. Hundreds of satisfied customers are testimony to our high quality and reasonable prices. Send us your specifications or prints.

THE MASTER PRODUCTS CO.
6400 PARK AVENUE • CLEVELAND 5, OHIO

...for Cleaning Die Castings and Machined Parts

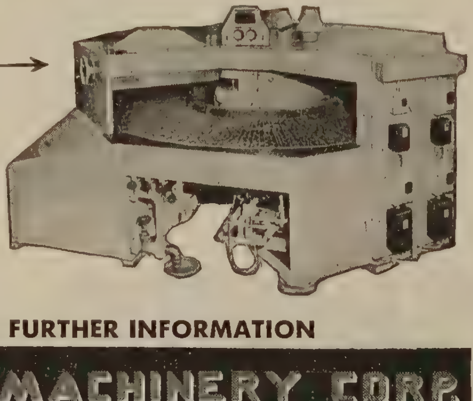


This horizontal return type automatic Washing, Rinsing and Drying Machine conveys delicate parts in individual holders.

- Operated by one man
- No marring of parts
- Positive cleaning and drying of intricate holes and recesses.

This Roto table Cleaning and Drying Machine handles a large volume of all sizes of parts.

- Operated by one man
- Occupies minimum space
- Simultaneous cleaning of a variety of different parts.



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METALWASH MACHINERY CORP.
149-155 SHAW AVENUE IRVINGTON 11, NEW JERSEY

it cannot in fairness and eq
deny a corresponding adjustm
in the wages paid to steel work
A further wage increase averag
approximately 13c per hr was
cordingly agreed upon effec
uly 16, 1948. The agreement w
the steel workers union has b
extended to July 15, 1950."

"Because of substantial increa
in costs arising from recent w
increases and the higher pr
paid for steel scrap, materials
supplies, our steel prices were
creased approximately ½c per
effective July 23, 1948."

Authorizes Laboratory For Plastics Resea

Birmingham

• • • **Construction** of a labo
tory for the division of plas
and textiles was authorized by
Southern Research Institute h
at a special meeting held July 1

The 3-story structure, toget
with an addition to Laboratory
5, will represent an investment
$200,000. Work will begin imme
ately.

In reporting on the institu
activities, Dr. William M. Mur
Jr., acting director, said resea
volume for 1948 would exceed $4
000, compared to $320,599 for 194
The institute now has 88
ployes. And the number is expec
to reach 95 by the end of the y

Handling Exposition Scheduled for Chica

Chicago

• • • **The Industrial** Packag
and Materials Handling Exposit
to be held in Chicago during
week of Oct. 4 will sponsor a p
tective packaging contest.
hundred fifty or more entries
expected according to A. L. Gre
Association of American Railro
chairman of the event.

Competition was developed by
association in furtherance of th
basic objectives of the group:
To inspire the application of so
engineering principles in the pa
aging field, (b) foster improveme
in the manufaçture, design and
plication of protective packag
materials, and (c) to encour
packaging research. Entries will
judged on factors of safety, ec

y, ingenuity, ease of handling
l conformance to carrier require-
nts.
nother feature of the exposition
ludes a packaging and materials
ndling "short course" conducted
the University of Illinois—Exten-
n Division, and the association.
ven sessions and 40 talks and
nel discussions will contain valu-
e reports on present practice,
l recommendations for improve-
nt, in such fields as machinery
l metal products, paper products
l printing, automotive industries,
craft industries, packaging equip-
nt and supplies, chemicals, food
ducts, electrical products, mer-
ndising, transportation, wood
ducts, material handling equip-
nt, rubber, textiles, leather goods,
rehousing, and plumbing.
Session topics range from tech-
ue of general freight and cargo
ndling to closure methods and
rking. Specific subjects for talks
l panels range from the use and
plication of conveyors through
stic containers and marking of
pments to export loading at port.

---

ortage of Good Coking Coal Is Industry's Boon

shington

• • **The shortage** of good coking
l, one of the steel industry's
ncipal postwar headaches, has
ulted in the undertaking of a
w survey by the Bureau of Mines.
Bureau Director James Boyd says
at a nationwide search for new
erves of coking coal will even-
ally extend to every state in the
ion, but preliminary emphasis
l be placed on sections of Penn-
vania, West Virginia, Kentucky,
nnessee and Alabama.
The study will be undertaken in
operation with the Coal Re-
urces Committee of the National
tuminous Coal Advisory Council.
e Coal Conservation Committee
the council also is cooperating
th the bureau in another study
extend the supply of coking coal
rough washing and blending
udies.
The 80th Congress has appropri-
ed funds for the undertaking.
. Boyd points out that there has
en no systematic inventory of
king coal based on recent infor-
ation. Existing estimates of re-
rves in certain areas are out of
te, the basic figures from which
ey are taken are not known to

WHICH OF THESE BOOKS WILL BE MOST PROFITABLE TO YOU?

For √ new ideas √ the hard-to-find fact √ new processes √ the best material or method √ the underlying principle—and in many other ways these books can be helpful to you. Pick the ones you want most and SEE THEM ON APPROVAL.

1000 production aids.

Illustrated Jig-Tooling Dictionary

By T. G. Thompson and R. A. Peterson

988 working drawings, with concise explanations, show you at a glance what you want to know about the design and construction of any piece of tooling equipment. Here is a wealth of up-to-date useful data not only on jigs and fixtures but also on machine tools, diemaking, plastic molding, welding and allied tools and procedures. A very handy reference for production department personnel as well as toolmakers.

Shows you what powder metallurgy can do for YOU.

Powder Metallurgy

By Paul Schwarzkopf and Associates

The inventor of the multi-carbide hard metals, new sintered iron and steel products, and many of the other powder metallurgical products and processes presents here the first complete explanation of the characteristics, industrial processes, products and underlying theory of metal powders. A wealth of production information and the latest postwar developments are included.

How to get your good ideas into production the best and easiest way.

Simplified Punch and Diemaking

By James Walker and C. C. Taylor

This book by two expert toolmakers gives you the latest information on the methods and materials for the design and construction of all types of punches and dies used for fabricating sheet metal, together with clear how-to-do-it instructions. One tool and die maker of 30 years experience wrote that he found the book so informative and so interesting that he sat up nights reading it! Full reference tables are included.

Increase your production and profits with successful supervision.

Improved Foremanship

By Auren Uris

Conversations between a new foreman and his fellow workers bring out in specific, down-to-earth terms everything that a production supervisor must know to be successful and how he can best learn it. Foremen and top management people alike have put their stamp of hearty approval on this book as one of outstanding helpfulness and benefit to all concerned.

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Use this coupon to get copies of any of these books ON 10 DAYS' APPROVAL. If you are not wholly convinced of their value to you, you may return them without charge.

THE MACMILLAN COMPANY, 60 FIFTH AVE., NEW YORK 11

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☐ Powder Metallurgy $8.00
☐ Simplified Punch & Diemaking ...$5.00
☐ Improved Foremanship ..$3.50

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Address ____________

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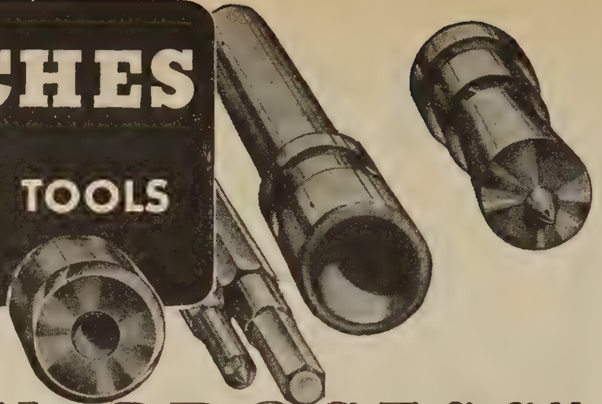
Company ____________

PUNCHES
and
OTHER TOOLS



"NEW PROCESS"

PUNCHES—DIES
RIVET SETS
COMPRESSION RIVETER DIES
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Made from high-grade alloy tool steels properly heat-treated, of uniform high quality—may be purchased with complete confidence for maximum service.

SINCE 1903

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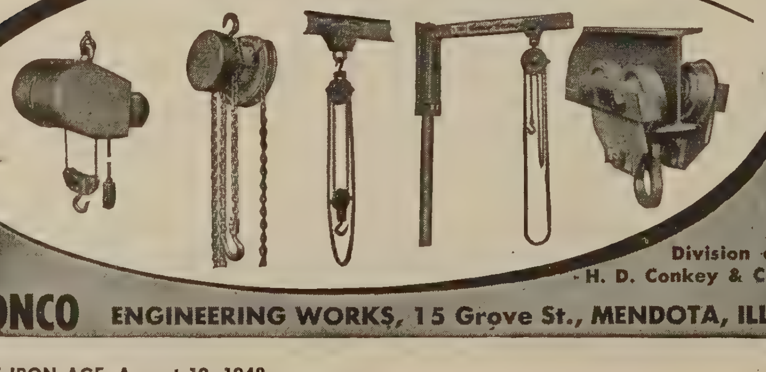
CONCO HANDLING EQUIPMENT

CONCO TYPE DM OVERHEAD ELECTRIC CRANE

● WRITE today for complete information on the CONCO line of hand-powered and electric cranes, hoists and trolleys — a complete line, tried and proven for over twenty years. CONCO engineers are qualified to recommend the right type of handling equipment for faster, more economical production in your shop. Write us now, and take advantage of our long experience in moving more materials, faster and at less cost.

CRANES • HOISTS • TROLLEYS



Division of H. D. Conkey & Co.

CONCO ENGINEERING WORKS, 15 Grove St., MENDOTA, ILL.

be authoritative, and they are capable of being adapted to pr ent-day terms of depletion and c covery, according to Mr. Boyd. formation from both governm and private sources will be incluc in the survey.

Meanwhile, the bureau is cont uing to make studies of ways remove sulfur and other impurit from coal which otherwise co be used for making coke. Ot studies are being made of ways blend highly-expanding coals w other coking coal to make bler safe for use in coke ovens.

Trico Appeals Decision On Excess Profits Tax

Buffalo

• • • **Trico Products** Corp. appeal an adverse decision in suit to recover more than $1 mill of excess profits and income ta paid to the Federal government 1936 and 1937, a spokesman for company said following announ ment that the U.S. Court of A peals for the Second New Y District had upheld a decision Federal Judge Knight in Buffal years ago.

The company seeks the refu on the ground that a larger s plus was essential to its busin while the government conten that the money should have b paid out in dividends.

Blaw-Knox Co. to Erect Large Extraction Pl

Pittsburgh

• • • **Chemical Plants** Div. Blaw-Knox Co. has received a s contract for engineering and p curement services on a new ton per day soybean extract plant to be erected at Decatur, for Spencer-Kellogg & Sons, The plant is expected to be co pleted in time for the 1949 cro

Acting as process engineers the Crosby Construction Co. Chicago, Blaw-Knox will suppl full complement of process eq ment including extractors, p sure toasters, deodorizers, va desolventizers, and Lewis flal mills.

The amount of the Blaw-K award was not disclosed but i reported to be part of a $3,000 expansion program.

Continuous Casting of Semifinished Steel

(Continued from page 80)

be carried through the freezing stages more rapidly as the casting rate rises. This can be done only by increasing the cooling capacity of the very limited area of the mold surface available for this purpose. Two steps are required to accomplish this: (1) Increasing the heat conductivity of the material of the mold, and (2) increasing the effectiveness of the application of the coolant.

The ability of the mold to absorb heat is related to its ability to pass on the heat it has absorbed. As it is not possible to increase greatly the time (and consequently the area of the mold) during which the billet is in direct contact with the mold, it is necessary to increase the speed with which the coolant wipes off heat from the outside mold surface.

The mere presence of a coolant on one side of a mold is not sufficient to conduct the heat away as rapidly as it is absorbed by the material of the mold. The coolant must be kept in circulation against the mold surface and should be applied so that the mass flow is everywhere as nearly constant as possible and quiescent pools are thus avoided.

It has been found in these experiments that a number of metals perform almost equally well as a mold material. However, stainless or heat-resisting steels that would seem a likely choice have some specific wetting tendency that makes them unsuited for this application. B & W has used 1/16-in. steel, ¼-in. copper, and 3/16-in. brass. However, for this purpose, brass has definite structural and fabricational advantages. It will be recognized that these thicknesses of these different materials provide about the same heat conductance. From the viewpoint of heat transfer the primary consideration was the problem of obtaining a sufficiently high Reynolds number.

B & W approached the problem with the conviction that the water flow had to be many times higher in order to assure no deterioration of the mold and to secure reasonable casting speeds. Water flows as high as 500 gal per min with a corresponding rise in temperature of only a few degrees have been used in this work. Quite naturally a flow system of this kind requires a special design if cavitation is to be avoided.

The quality of the continuously cast steel is also greatly influenced by the volume of slag introduced with the metal and by the turbulence caused by pouring the steel in the mold. This work has shown that continuous casting required a slag-free steel. This problem alone has probably accounted for much of the earlier difficulties in this art. If slag enters with the metal, it floats on the surface of the liquid pool and makes trouble, by accumulating to a critical size and then gulping down between the mold wall and the casting. This oyster or blob of slag on the side, because of its lower heat conductivity, tends to maintain temporarily a pocket of liquid steel behind it. The delayed freezing of this pocket of metal tends to cause shrinkage cracks of such size as to ruin the billet. Slag must be excluded in continuous casting to a degree that doesn't enter into other steelmaking processes. To accomplish this the steel is poured from the holding furnace into a tundish, designed to strain out the slag, and thence into the mold. The tundish also cuts down the velocity of the metal by shortening the distance through which it falls into the mold, thereby minimizing turbulence. Heretofore, only a preheated tundish has been used. When such a tundish is used, and a minor interruption occurs in the casting process, the metal in the tundish may begin to freeze. The slower the mass flow of the metal through the tundish, the better the slag is eliminated, but the greater is the tendency to freeze. For both these reasons an electrically heated tundish has been designed and is about to be installed.

The question of refractories is quite important. In the continuous casting of steel it is necessary to have accurately directed flows of metal and no slag, and it is difficult indeed to find a refractory that will not erode under constant operation. The refractories in use in this operation at present are sufficiently satisfactory for commercial purposes but still further improvement is desirable and appears to be attainable.

By letting the liquid steel drop only a very short distance into the mold, there is little turbulence, and the quiescent condition affords an opportunity for impurities and gas inclusions to separate from the metal. It also permits the more rapid flow of heat to the cooling surface of the mold and tends to attain even cooling and uniform crystallization of the metal.

A non-reacting gas, in this case argon, is introduced above the liquid metal pool in the mold to discourage oxidation, as oxidation products cause wetting and fouling of the mold surface. Argon was chosen because of its high density and because it forms no compound with iron. The atmosphere above the liquid metal pool while the casting operation is going on has been analyzed. Directly above the surface, the atmosphere contains about 93 pct argon and nitrogen, 6 pct H_2 and the remaining 1 pct is made up of CO_2-O_2-CO-CH_4.

Below the mold the casting passes through an insulated chamber which arrests and controls the speed of further cooling. Indications are that it may be desirable to make this chamber a furnace. Below this insulated chamber is the withdrawal mechanism regulating the speed of movement of the steel billet, after which the casting passes an oxyacetylene torch which travels down the billet a short distance while the billet is being cut to specified length which can be as much as 35 ft. The cut-off section of billet is lowered to a horizontal position by a cradle arrangement.

In general the condition of the surface of the billet will be determined by conditions within the mold, and the condition of the interior of the billet will be determined by the casting rate. The freezing of the billet will be determined by the casting rate. The freezing of the billet must of necessity occur first at the perimeter, and the rapidity of freezing through the billet determines the size of crystals for a given alloy. As the growth of crystal structure is from the perimeter toward the center, and as the metal shrinks as it freezes, it follows that a cavity or series of cavities will form in the center unless there is sufficient liquid metal available and a channel through which to fill them.

This question of porosity has been the subject of a great deal of experimental work at Beaver Falls. Part of this experiment has been carried on also through the able assistance of Dr. George Sachs at the Case Institute of Technology. This work in total has revealed relationships between the porosity, the section shape, and the resultant dendritic freezing pattern of a most valuable and unexpected kind.

In order to study the crystal growth and regions of porosity for certain types of casting cross-sections, Dr. Sachs has experimented extensively using at first zinc and later on aluminum alloy. This test procedure with aluminum alloy has produced a crystal structure similar to that for steel. In this work Sachs followed the pattern of Bezdeneshnihk (Metallurg, 1937, 12 (6), pp 66-78) who used aluminum ingots as an analogy to steel ingots in order to investigate the location of shrinkage cavities and planes of weakness. At Beaver Falls similar studies have been made with paraffine and stearine, following the pattern of experiments by Brearly (Ingots and Ingot Molds, London, 1918), Carlsson and Hultgren (Jerkontorets Ann., 1936, 120, pp. 577-587) and Gathmann (Ingot Phase of Steel Production, Ed. 2, Baltimore, 1942). Ovals of special proportions had been conceived and these studies have confirmed that these are the most practicable cross-section to continuously cast.

These ovals will readily go into a rolling mill for shaping into rounds, or can be rolled into flats. In general, and within limits, there is an advantage in as flat an oval as the rolling mill superintendent judges he can handle efficiently in making the intended final product.

The photographs with this article show an oval being cast at the rate of 12 tons an hr. The liquid steel temperature as it entered the mold was 2900°F and the temperature of the casting at the pinch rolls was 1825°F. The steel was an SAE 1025 carbon steel analyzing 0.24 C, 0.51 Mn, 0.015 P, 0.015 S, 0.05 Cr and 0.05 Ni. The casting was of excellent surface and internally of such quality as to roll to a satisfactory finished product.

The Proof Is the Bloom

Quite rightly, the proof of any steelmaking process is the quality of the blooms it produces. There are various established criteria of sound steelmaking practice, and it might be of interest to examine both the theoretical and the practical aspects of continuously cast steel in the light of these criteria.

(1) In conventional steelmaking a truly sound ingot can only result when the steel in the mold solidifies progressively as nearly as possible from the bottom to the top. In continuous casting this requirement is met more ideally because of the flexibility of the heat withdrawal pattern that can be obtained by applying regulated cooling below the mold while the section still has a liquid core.

(2) Fast cooling of the casting serves to minimize ingotism and segregation of minor constituents. Continuously cast steel is cooled vastly faster than conventional ingots, the result being a fine and uniform crystalline structure and surprisingly little segregation.

(3) The best quality steels are cast into big-end-up ingot molds fitted with some form of refractory hot top, to minimize primary pipe and segregation and eliminate secondary pipe. Continuous casting almost ideally meets these conditions. Although the mold is of uniform cross-section, it approximates in behavior the big-end-up mold. As for hot topping, the continuous process supplies an infinite or constant hot top for progressive feeding, thereby contributing to the elimination of pipe.

(4) The surface of an ingot should be free, or relatively free, of checking and scabs, and the interior should be free of entrapped slag. These conditions are difficult to meet even in conventional practice. They also cause difficulty in continuous casting. But, in general, the continuously cast product violates these requirements far less than the conventional product and in addition, the process offers less opportunity for dirt or other foreign material to enter the casting.

(5) The best quality steel should not have pronounced cleavage planes, or lines of weakness, due to a pronounced columnar structure arising from slow cooling of a conventional ingot. Continuously cast steel is cooled quickly, and therefore tends toward a fine grain rather than columnar structure. Even so, this problem has constituted one of the most troublesome difficulties

in the continuous casting process. Satisfactory control of it is obtained by use of the best casting cross-section combined with regulated cooling, both in the mold and below it.

(6) For the blooming mill, the best ingot is relatively long with as little taper as possible. Continuously cast steel billets may be as long as desired. There is no taper.

(7) A small ingot is generally conceded to give a better quality product than the very large ingots which are common practice in most shops today. Continuously cast billets are by their very nature small in cross-section. The best cross-section to cast continuously for high quality material are ovals of special proportions that satisfy the criteria of both good casting and rolling practice.

The knowledge gained in meeting most of these criteria indicates that the remainder are obtainable.

Experimental work already completed on continuous casting of steel has given proof that with operators possessing normal skill, in conjunction with conventional control systems, a satisfactory process for many of the products of the steel industry will ensue. It is the intention to complete all of the experimental work in connection with the cross-sections mentioned earlier in this article before licensing under the Williams patents and also under other patents which are expected to be granted. It will be the policy of B & W Tube in licensing to extend licenses to all those having use for the process and under license conditions best adapted to its widespread use.

Magnetic Powders of Colloidal Size

SEVERAL new methods of making magnetic powders of colloidal size (average 0.1 micron) are discussed in a recent issue of Metal Powder Report, published by Powder Metallurgy, Inc., London. These very fine powders, which may be as small as 0.01 micron, are then used for manufacturing permanent magnets with coercivities up to 2000 oersteds. Even straight colloidal iron powder gives a magnet with a coercivity of 430 oersteds, and in no case is any heat treatment of the product necessary.

These new methods, according to the report, are described in British patent No. 590,392 issued to Societe d'Electro-Chimie, d'Electro Metallurgie et des Acieries Electriques d'Ugine. The methods of powder manufacture comprise: (1) Iron or nickel powder by the Raney method, i.e. the reaction product of the respective aluminum alloy with sodium hydroxide. (2) Iron, nickel and cobalt powders by decomposition of the respective formates, oxalates, hydroxides or carbonates with simultaneous reduction under stated conditions; alloy powders can be made from suitable mixtures; the amount of residual oxide is not critical, but the powder is generally pyrophoric and must be put into acetone or ether immediately on leaving the furnace. (3) Colloidal carbonyl powders by bubbling a mixture of carbonyl vapors through oil at 300°C (572°F), containing ether to promote precipitation. (4) Colloidal carbonyl iron powder by bubbling hydrogen through iron carbonyl at 50°C (122°F).

With regard to the magnets, the usual compacting pressures of 6 to 60 tons per sq in. are sufficient to give iron compacts with a density of 5 to 6, according to the report. Sintering conditions are not mentioned in any of the examples and the powders should be worked either cold or at temperatures below 250°C (482°F).

Iron formate is reduced at 320°C (608°F) for 1 hr in hydrogen flowing at the rate of 0.1 g per min per g formate. The powder is put under acetone as it is formed, taken out and compacted, having the following properties: (1) Density, 3.0; coercivity, 530 oersteds; remanence, 3000 gauss. (2) Density, 6.5; coercivity, 410 oersteds; remanence, 5700 gauss.

Ferric hydroxide treated as above gave a powder which was pressed to a density of 5.0. The coercivity was 430 oersteds, the remanence 4100 gauss. Raney iron pressed to a density of 5.5 had a coercivity of 380 oersteds and a remanence of 4300 gauss.

Cobalt formate treated similarly to the iron formate and pressed to a density of 6.0, had a coercivity of 350 oersteds and a remanence of 5700 gauss.

Iron-cobalt (73:27) powders were made by reducing the mixed formates: (1) at 350°C (662°F) for 45 min in hydrogen flowing at the rate of 0.02 g per min per gram formates, (2) similarly but in hydrogen flowing at the rate of 0.1 g and (3) at 380°C (716°F) for 30 min in hydrogen flowing at the rate of 0.06 g. By pressing the powders in each case to different densities the effects of the reduction conditions are easily illustrated in the following table which is compiled from the data given in the Patent.

Experiment	No. 1		No. 2		No. 3		
Density	2	4	2	4	2	4	6
Coercivity (oersteds)	1400	1240	1300	920	1200	690	560
Remanence (gauss)	1225	2500	1900	3600	2900	6200	9400

A 95:5 iron-cobalt magnet was also made, but the characteristics are omitted. Carbonyl iron made by bubbling a mixture of carbonyl vapor and hydrogen in oil at 300°C (572°F) was pressed to a density of 5.0. The coercivity is given at 450 oersteds and the remanence as 4200 gauss.

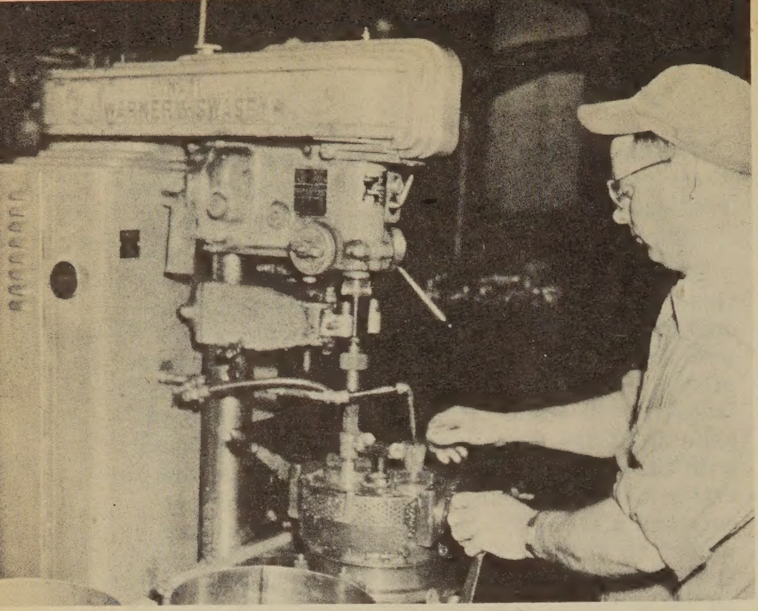


FIG. 1 - Holes in die cast Chevrolet gear shifter control supports are tapped on a Warner & Swasey machine equipped with a two-place indexing fixture.

Rapid Machining Operations on Die Castings

° ° °

MANY zinc die castings produced by the Brown-Lipe-Chapin Div. of General Motors Corp., Syracuse, N. Y., require minor machining operations which are done rapidly because little metal has to be removed and good tooling is applied. Among the jobs of this type is the tapping of a 1-in. hole, 16-thread, 11/16 in. deep in the upper support of a Chevrolet gear shift control, a component of the steering gear assembly. A feature of this work is that the tapping must be a precision job in which pitch diameter is held between the limits of 0.9599 and 0.9626 in.

A Warner & Swasey precision tapper, shown in fig. 1, is used and is equipped with a lead screw with the same 16-pitch as the tap. Feed is automatic, but speed is gained by providing a two-place fixture in which the operator loads a casting in the idle position while one in the opposite holder is being tapped.

The fixture holds the barrel to be tapped while the two projecting ears, whose inner faces are part of a semicircle previously machined, fit around the end of a locator of mating diameter. After loading and after the tap is backed out of the prior piece, the fixture indexes 180° to bring the newly loaded piece into tapping position.

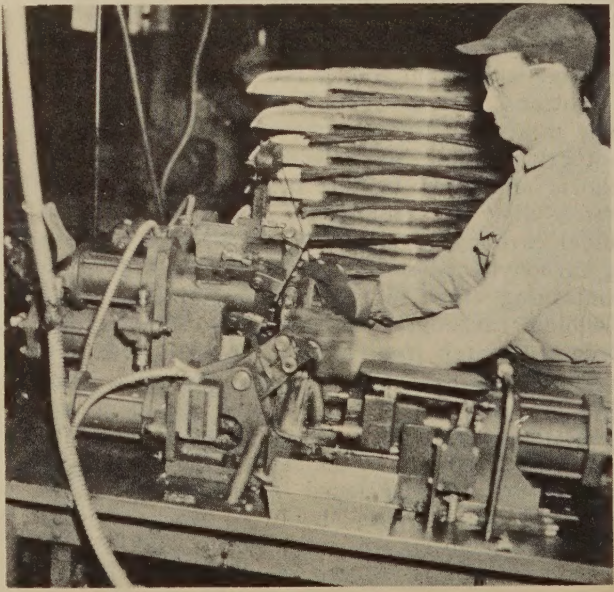
The tapped casting is removed and after another is loaded in its place, indexing is repeated. In this way 192 pieces an hr are tapped. Smoothness of thread is insured by keeping the tap sharp and by using two streams of light petroleum oil playing on the tap and on the piece being loaded. The coolant also helps keep the tap from loading.

Another rather unusual job is piercing of eight holes at one time in a die cast Chevrolet header bar, using a special machine shown in fig. 2. This casting, which fits at the top of the radiator grille, is bowed, as viewed in plan, and has a C-shape transverse section. Holes come in ears so located that they cannot be cored readily or be pierced in any single conventional press setup. Drilling would be slow and require a special machine to produce all holes at once.

These considerations account for the special machine which has four air operated clamps and four air plungers to each of which two piercing punches are attached. Two sets of punches move toward the operator and two in the opposite direction after the work is clamped against die faces. Slugs punched out are pushed through the dies and into tubes down which they fall into a tote box for return to melting furnaces.

The operator is required only to set the casting in place and move the handles of air valves. As the eight holes are pierced almost instantly, the rate depends almost entirely upon the speed at which castings can be set in place and removed.

FIG. 2 - This special machine air-clamps a Chevrolet die cast header bar and then advances air-operated punches, two of which show in the illustration, to pierce eight holes for fastenings.



;anadian Sheet Prices Advanced; Production Drops From May Record

oronto

• • **Canadian steel** makers who d not take advantage of the 'PTB approved price increase on eel sheets, when other iron and eel lines were advanced last June, ave moved up the base price on ot rolled steel sheets 20¢ to $3.60 er 100 lb, and galvanized sheets,)¢ to $6.05 per 100 lb effective ug. 1, 1948. No further changes ave been announced for the carbon eel list, but some increases on ctras have gone into effect on alloy eels.

Steel production in Canada for ıly and August will show a decline om the high record month of [ay, as a result of holidays for eel workers. While there will be me loss in output of pig iron and eel ingots, the largest decline will e in finished steel products as finhing departments are chiefly afcted by holiday lay-offs. Wire and ails will be the heavy losers as it reported by some firms that these epartments close entirely for the vo week holiday period.

As a result of the change in rocess by Algoma Steel Corp., ault Ste. Marie, this company can ow charge different materials to s furnaces to obtain greater production tonnage and as a conseuence Canada's rated basic open earth ingot capacity has been oosted 290,000 net tons a year to total of 3,060,000 net tons. gainst this increase, however, has een the closing down of the elecic furnaces formerly operated by orel Industries Ltd., Sorel, Quebec, hich has resulted in 55,000 tons nnually being dropped from Canda's rated capacity for electric ırnaces, leaving the new total at 20,000 tons a year. Thus total inot capacity in Canada, basic open earth and electric, now stands at 448,000 net tons against the forer rate of 3,245,000 net tons a ear ago.

Iron and steel production as a hole for 1948 will show some improvement over the year immeditely preceding, but despite this ıct there are no indications of any asing in the supply situation this ear. On the contrary there have ready been indications of tighteng on some materials and quotas or the last quarter have been reıced.

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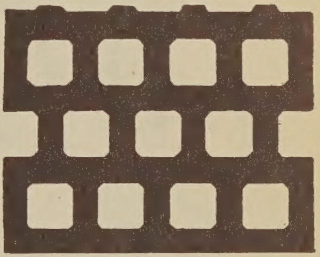

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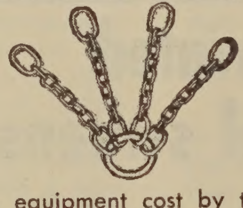

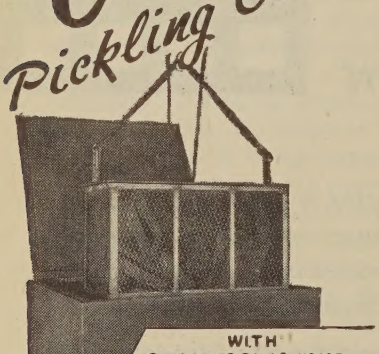

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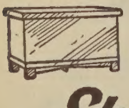

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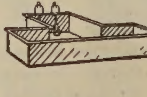
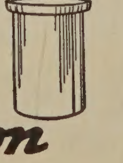


RETORTS



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Up to the present, Canadian ste producers have no idea as to wh tonnage, if any, they will be call upon to provide under the Eur pean Recovery Plan. But it is u derstood that steel provided by t U. S. under E.R.P., or for the e larged defense program in th country, may be reflected in som curtailment in Canadian impor from across the line.

Already Canadian steel make are finding heavier demand f their various products from dome tic consumers who find it difficu to obtain supplies from the State This increased demand is large responsible for the further tighte ing in overall domestic supply.

Canadian steel makers in gener see no improvement in the domest steel situation for this year and a doubtful that there will be muc closer balance between supply an demand in the first half of 1948.

Canadian steel producers now a fully booked on production of mo lines to the end of the fourth qua ter, and capacity for other line is rapidly filling.

Sheets and plate are the scarc items on the list and it is claime that the market easily could absor more than double present suppl While carbon steels are the greate worry with regard to supply, it stated that alloy steels are steadil becoming tighter and on some line delivery dates are being set bac for greater periods.

Domestic steel producers are st uncertain about steel prices in th future, but continue to point o that production costs are movin upward and anything may happe to prices on short notice. In th meantime all bookings are on price to be made known at time shipment.

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Washington

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